1996 Index for *Missouri Epidemiologist*

KEY

J/F96 = January/February 1996
M/A96 = March/April 1996
M/J96 = May/June 1996
J/A96 = July/August 1996
S/O96 = September/October 1996
N/D96 = November/December 1996

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Governor's Council on AIDS – Annual Report 1995

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Background and Purpose

The mission of the Governor's Council on AIDS is to create an effective service system for persons living with and at risk for HIV disease through increased coordination among state government agencies providing HIV prevention and care services in Missouri.

The Governor's Council on AIDS was formed after customer concerns were presented to Governor Carnahan and department directors in September 1994 regarding lack of service coordination among governmental agencies. These concerns were articulated by the Missouri AIDS Council, a statewide policy and advocacy organization, spanning the continuum of HIV prevention and care services. The Missouri AIDS Council in their report, *AIDS in Missouri: Report to Governor Carnahan*, presented a series of case studies in which persons with HIV had experienced significant difficulties in their access of HIV care services provided through the various state agencies.

In response to these concerns, Governor Carnahan established the Governor's Council on AIDS in April 1995 through Executive Order #95-10. The council subsequently convened in May, July, September and November 1995, and presented its annual report to the governor in December 1995.

The formation of the Governor's Council on AIDS is part of Governor Carnahan's efforts to improve government service delivery and harkens back to the time of gubernatorial task forces in an environment of scarce federal and state resources for HIV. The task forces historically gave way to separate and independent departmental responses as departments received federal grants addressing HIV. As the HIV epidemic continues to grow and the need for adequate prevention and care efforts clearly exceeds available resources, it becomes imperative for governmental agencies to coordinate efforts to avoid duplication of services. Such coordination will also allow these agencies to maximize their efforts in order to create integrated service systems for prevention and care for persons with HIV.

Other states having similar governor's councils include: Colorado, Hawaii, New Mexico, Nevada, Delaware, Utah and New York.

The membership of the Governor's Council on AIDS includes state departments which provide HIV care and/or prevention services: departments of Health, Mental Health, Social Services, Corrections and Elementary and Secondary Education. The departments are represented by staff members who function at policy levels, thus ensuring their ability to commit resources for the improvement of services. Membership on the Governor's Council on AIDS also includes community partners who serve as direct links to communities living with or at risk for HIV. They are: the Governor's Council on Disability, the Missouri AIDS Council, the Minority Health Advisory Committee and a person living with HIV.

The tasks of the Governor's Council on AIDS include the following:

- Identify current services.
- Coordinate with other departments to close service gaps and create a comprehensive service delivery system.
- Respond to case studies, community feedback and the governor's recommendations.
- Develop public policy to strengthen the prevention of HIV infection and the care for persons living with HIV.
- Report to the governor annually.

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Inside this Issue...

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The Governor's Council on AIDS has the duty and responsibility to communicate with affiliated or associated organizations to increase communications about HIV prevention and care service needs and to assist the council in meeting its mission. An example of such organizations include: minority health alliances, HIV Care Consortia, HIV/STD community planning groups, Communities 2000, Caring Communities, the Missouri AIDS Council, local health departments, community mental health centers, local jail systems and school districts.

The Governor's Council on AIDS is convened by the Missouri Department of Health, lead agency in the Governor's Cabinet regarding HIV-related issues. Participating departments share the costs associated with the council, including development of case studies, transportation and associated materials to assist the council's functioning.

Annual Report

The Governor's Council on AIDS is required to report to the governor annually. The report contains two key components:

1. A separate report from each department regarding their response to customer concerns, the work of the council and recommendations for improvement

2. A report from the Missouri AIDS Council regarding community and consumer evaluation of the work of the Governor's Council on AIDS, the process associated with this council and the Governor's Council on AIDS recommendations for service improvement

Executive Summary

The 1995 report to Governor Carnahan from the Governor's Council on AIDS contained the following:

- A catalog of the service issues presented to the council in 1994 and 1995, and the subsequent improvements

- Recommendations to Governor Carnahan from the council to improve HIV prevention and care services in Missouri

- A report from the Missouri AIDS Council containing an evaluation of the Governor's Council on AIDS and its work during 1995

Overall, the work of the Governor's Council on AIDS during 1995 was challenging, given that the council was established in the middle of the year and had many issues to address prior to December 1995. In addition to what is outlined below in the departmental reports, the council also accomplished the following:

- Departments responded to customer cases presented by the Missouri AIDS Council.

- An integrated service system was identified across the departments for improvement in 1996–97

- Assistance was provided in the response to the early expenditure of Ryan White HIV Care funding.

Copies of the 1995 annual report may be obtained by contacting the Missouri Department of Health, Bureau of STD/HIV Prevention, 1730 East Elm, Jefferson City, MO 6510l, Ph: (573) 751-6141 or FAX: (573) 751-6417.

Departmental Reports

Department of Social Services

Key service issues for the Department of Social Services (DOSS) included improvements to the Medicaid program in the areas of application, reimbursement and service package. These issues were addressed by the Division of Medical Services. Specific issues for the Division of Aging included access to skilled nursing care for persons with HIV in rural areas.

DOSS will provide training regarding HIV to increase awareness of Medicaid access issues. The department is currently considering expansion of access to Medicaid waiver services by the Department of Health's contractual service coordinators (case managers for persons with HIV disease). In addition, DOSS will review the possibility of reimbursing for HIV service coordination. These improvements will decrease the administrative paperwork required for persons with HIV disease to obtain Medicaid benefits, and they will strengthen the continuity of care by allowing a person with HIV infection to remain with the same caseworker throughout their disease.

DOSS has also recognized the problems many persons have in accessing skilled nursing care in rural areas of the state. Currently there is interest in an innovative project in St. Louis which offers capitated Medicaid services to persons with HIV in a residential care setting. This project may serve as a model which could be replicated elsewhere in the state.

Department of Elementary and Secondary Education

Key service issues for the Department of Elementary and Secondary Education (DESE) include the need for improvements to the Social Security Disability Determination process to allow for expedited appeals for persons with HIV disease, and the need for improvement in the quality of HIV education being offered in local schools throughout Missouri.

In response to the issues regarding Disability Determinations, DESE selected disability determination staff in local areas throughout Missouri to be key contacts for persons with HIV. The department will engage in a training program for disability determinations staff statewide to assist in expediting the application process for persons with HIV disease. The department will also seek to improve communications with those medical providers who care for signifi-

cant numbers of persons with HIV in order to enhance the process of obtaining necessary documentation for disability determinations. In addition, the department will identify HIV-infected persons who should be receiving payments but were denied and attempt to obtain presumptive eligibility so that they can receive payments during the often lengthy disability determination appeals process.

In response to the issue regarding the quality of HIV education provided in Missouri schools, DESE will present health profile data through the Youth Behavior Risk Factor Survey (YBRFS) to assist in the improvement of HIV instruction in schools to identify at risk behaviors by youth in their school districts. The YBRFS is a statewide survey, weighted on a national scale, which identifies behavioral risk factors associated with risk of HIV transmission among Missouri youth. The department also indicated that the Missouri School Improvement health curriculum includes mandatory universal precautions. Universal precautions training would assist schools in infection control and in minimizing fear of a potential HIV-positive person in school. The department recommended that the council identify incentives for schools participating in this training statewide.

Department of Mental Health

Service issues posed to the Department of Mental Health (DMH) included the need for each of the following: improved access to mental health treatment by persons with HIV disease, increased HIV education in drug treatment centers, expansion of HIV testing in mental health facilities, improved community relations to ensure optimal care for persons with HIV disease in mental health facilities and psychiatric placement for persons with AIDS who are diagnosed with HIV-related dementia.

In response to the service issues posed, DMH is collaborating with the Department of Health on a project to create an integrated model of care for persons with poly diagnosis. (Poly diagnosis refers to persons with HIV disease plus mental illness and/or substance abuse treatment needs.) DMH indicated that all persons with dementia, whether or not HIV-related, are not part of the Comprehensive Psychiatric Services target population unless they also suffer from other serious mental illnesses. The department will expand it's annual Alcohol and Drug Abuse Spring Training Institute to include HIV risk reduction strategies, which include encouraging persons in treatment for substance abuse to be tested for HIV. All substance abuse treatment facilities will conduct an HIV risk assessment for their clients and either refer those who wish to be tested for HIV to the local health department for testing or provide on-site testing. The department is currently considering the implementation in methadone and women's treatment programs of an HIV testing pilot project using oral fluid specimens. In addition, the department is working to improve community relations. Two customer contacts have been established in the department to help address service issues involving Psychiatric Services and Alcohol and Drug Abuse. Also, all treatment centers have been encouraged to be involved in the regional HIV prevention community planning process through the Department of Health.

Department of Corrections

Service issues posed to the Department of Corrections (DOC) include the need for improvement in the HIV care for incarcerated persons with HIV, improvement in HIV medication management for persons in local jails, access to condoms upon parole from prison and increase of HIV prevention efforts for personnel and inmates in state prisons .

In response to the need for improvement in the HIV care for incarcerated persons with HIV, the DOC has worked with the Governor's Council on AIDS to supplement the former clinical protocol with a Ryan White Title III B protocol in order to strengthen the overall management of HIV in this setting. (Ryan White Title III B refers to HIV clinics funded through the Ryan White Federal Care Act of 1990.) In order to strengthen statewide compliance with quality standards, the department is planning to have all DOC sites accredited by the end of 1996 through the National Commission on Correctional Health Care. The department received such accreditation for six sites in 1994 and 1995: Boonville Correctional Center, Central Missouri Correctional Center, Chillicothe Correctional Center, Fulton Reception and Diagnostic Center, Moberly Correctional Center and Ozark Correctional Center.

In response to HIV medications management in local jails, the department indicated that local jails are responsible only to local jurisdictions and not to DOC. The department advised community organizations to encourage improvements through local jurisdictions of the jail system. The department recommended that the Governor's Council on AIDS work with the Missouri Sheriff's Association and local health departments to improve medications management at local levels.

In response to the council's recommendation regarding access to condoms, DOC will make condoms available to inmates at parole upon request, and will specifically ensure that parole officers and medical personnel are prepared to provide parolees with information regarding available services.

With regard to improvement and enhancement of HIV prevention efforts in prisons, DOC has targeted probation and parole workers, as well as medical services personnel, as priority groups for HIV prevention education. The department is also implementing the curriculum "Be Proud, Be Responsible" in state correctional drug treatment programs in collaboration with the Department of Elementary and Secondary Education. DOC has also been utilizing its inmate newsletter, *The Other Side*, to

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provide HIV information to inmates. In addition, the department provides communicable disease instruction, including universal precautions training, to all entry level staff at their basic training classes, and offers inservice sessions quarterly. All inmates receive HIV education upon entry into the prison system, along with mandatory HIV testing. HIV/AIDS literature is available in the medical units and in inmate libraries.

Department of Health

Service issues posed to the Department of Health (DOH) include the need to begin anonymous HIV testing in the Columbia area, and to provide increased service coordination services in Northeast Missouri.

In response to the anonymous testing issue, DOH will conduct an anonymous HIV testing study during 1996 to examine the demand for such testing in the Columbia area. Missouri law provides for a maximum of three anonymous testing sites for HIV, which are located in St. Louis, Kansas City and Springfield. The DOH study will determine whether the department needs to request a statutory change to allow for additional anonymous testing sites.

In response to the issue of access to service coordination in Northeast Missouri, the department will consider the possible use of part-time service coordinators in this area pending increase in client base and increase in funding. Due to the decrease in client cases in Northeast Missouri, DOH had removed the full-time case manager and provided service coordination services to persons in this area through the Central region's service coordination office.

Recommendations to Governor Carnahan from the Governor's Council on AIDS

The following recommendations were made to Governor Carnahan by the Governor's Council on AIDS:

HIV Services

1. Coordinate with other state governors to increase national advocacy for a more timely federal appeals process for disability determinations.

2. Coordinate with local jails to insure appropriate dispensing of HIV medications and universal precautions training.

3. Review and improve the Medicaid spend-down process to simplify program requirements and the time period for qualification.

4. Fund HIV service coordination through Medicaid funds.

HIV Prevention and Education

1. Distribute condoms upon release from prison.

2. Integrate universal precautions, medication management and HIV-related issues training into curricula for state and local Highway Patrol personnel.

The Missouri AIDS Council Performance Report

The Missouri AIDS Council reported that they were pleased with the progress of the Governor's Council on AIDS during the six months of its existence, and anticipated continued commitment on the part of the administration and all governmental departments to this process in the coming year.

Notable areas of progress included the following:

- Establishment of the Governor's Council on AIDS
- Creation of departmental workgroups with community input
- Consumer focus and customer service system identification
- Identification of key issues
- Discussions centering on policy changes
- Identification of barriers to delivery of services
- Inter-departmental coordination

The Missouri AIDS Council offered additional commentary on particular departmental involvement and improvement, and recommended the following to Governor Carnahan:

- Assure appropriate representation of all departments, committees and councils at all Governor's Council on AIDS meetings.
- Assign a member of the governor's staff to attend the Governor's Council on AIDS meetings.
- Expand consumer representation.
- Coordinate a three-year strategic plan addressing HIV/AIDS issues and policies.
- Extend required participation, when needed, to other departments or agencies to accomplish the work of the Governor's Council on AIDS.

Conclusion

The Governor's Council on AIDS is part of the customer service improvement effort undertaken by Governor Carnahan. Large governmental departments, often with categorical programming and funding, have come together successfully to form the council. The council will continue to work diligently to improve HIV prevention services and care programs throughout Missouri. For further information about the Governor's Council on AIDS, please contact:

Bureau of STD/HIV Prevention
Missouri Department of Health
1730 East Elm
Jefferson City, MO 6510l
Ph: (573) 751-6141
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Reptiles as Pets? Dangers?

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Reptiles are popular as pets in the United States. Millions are reportedly owned by Americans. Most popular reptiles will not breed in their closely confined, contaminated environments. Thus, most reptiles are captured in the wild and imported. A high proportion of reptiles are asymptomatic carriers of *Salmonella.* Close confinement has resulted in a carrier rate exceeding 90 percent. Attempts to eliminate *Salmonella* carriers with antibiotic treatment of reptiles have been unsuccessful, and have led to increased antibiotic resistance. Reptiles can become infected through transovarial transmission, direct contact with other infected reptiles or contaminated feces. Hatchlings, especially iguanas, routinely eat feces to establish normal intestinal flora for hindgut fermentation. The U.S. Fish and Wildlife Service reports that imported iguanas have increased from 27,800 in 1986 to 798,400 in 1993, with 90 percent of them carrying some strain of intestinal bacteria.

More and more health departments are encountering individuals infected with unusual *Salmonella* serotypes in which the patients had direct or indirect contact with reptiles (e.g., lizards, snakes, iguanas or turtles). *Salmonella* species implicated include these serotypes: *S. abaetetuba, S. aruzibae, S. kintambo, S. litchfield, S. marina, S. poona, S. rubislaw, S. stanley* and *S. wassenaar.* In many of these cases, the same serotype of *Salmonella* was isolated from patients and reptiles with which they had contact or a common contact.

In most cases where salmonellosis is suspected, the initial suspicions regarding the source of infection focus on possible foodborne, person-to-person or waterborne transmission. Where normal sources of infection do not appear appropriate or have been ruled out, attention should turn to the family's pet reptile. Reptile droppings should be submitted to the State Public Health Laboratory for culture. It is not necessary for the affected person to have handled the reptile in question nor items in the cage. Infections can be acquired from other contaminated objects or inapparent infections in other individuals. The organism can be passed on to the affected individual by direct or indirect contact or through contamination of food.

Symptoms of salmonellosis include acute enterocolitis, headache, abdominal pain, diarrhea, nausea, vomiting, dehydration, fever, anorexia, septicemia and/or focal infection. Severe complications of *Salmonella* infections occur in young children, immunocompromised and the elderly. Infections may result in invasive illness, such as sepsis and meningitis.

Some states have issued health alerts to pet stores to warn owners and prospective owners about the risks of salmonellosis associated with contact with reptiles. Store owners have been asked to provide instructions about proper handling of reptiles to all persons purchasing a reptile and to also post the alert. During the early 1970's, small pet turtles were an important source of *Salmonella* infection. In 1975, the Food and Drug Administration prohibited the distribution and sale of turtles with a carapace less than four inches. These measures resulted in the prevention of thousands of cases of salmonellosis. Since 1986, the popularity of iguanas and other reptiles has increased, as has the transmission of salmonellosis to humans.

In the past several years, the Centers for Disease Control and Prevention has been investigating, with the collaboration of state and local health departments and the National Herpetological Alliance, the marked increase in human salmonellosis cases associated with exposure to reptiles.[1] It is now estimated that three to five percent of the two to six million human salmonellosis cases each year may be attributed to reptiles. Many of the illnesses have been severe.

Salmonellosis has been attributed to reptiles in Missouri. Two cases of *Salmonella* in Boone County in 1995 were attributed to reptile handling. In 1995, the Kansas City metropolitan area had three cases of *Salmonella poona* in persons exposed to reptiles. Thus far in 1996, one case has been attributed to iguana handling in Phelps County. (A comprehensive effort to identify all reptile-associated cases statewide has not been performed. This information is only intended to point out that cases are occurring in the state.)

Recommendations for Preventing Transmission of *Salmonella* from Reptiles to Humans

1. Persons at increased risk for infection or serious complications of salmonellosis (e.g., pregnant women, children younger than 5 years of age, immunocompromised and the elderly) should avoid contact with reptiles.
2. Reptiles should not be kept in child care centers and may not be appropriate pets in households in which persons at increased risk of infection reside.
3. Veterinarians and pet store owners should provide information to potential purchasers and owners of reptiles about the increased risk of acquiring salmonellosis from reptiles.
4. Veterinarians and operators of pet stores should advise reptile owners to always wash their hands after handling reptiles and reptile cages.
5. To prevent contamination of food-preparation areas (e.g., kitchens) and other selected sites, reptiles should be kept out of these areas—in particular, kitchen sinks should not be used to bathe reptiles or to wash reptile dishes, cases or aquariums.

REFERENCE:

1. CDC. Reptile-associated salmonellosis—selected states, 1994–1995. MMWR 1995;44(17):347-50.

Mosquito-Borne Disease Surveillance Program – 1995

F. T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

The Department of Health again conducted surveillance programs for St. Louis (SLE), Western Equine (WEE), California (CE) and LaCrosse (LAC) encephalitis during the 1995 mosquito season. The following surveillance systems were operational in 1995:

- Active surveillance for
  - -human cases of disease
  - -equine cases of disease
  - -virus activity in mosquitoes
  - -virus activity in wild birds
- Monitoring of sentinel chicken flocks for virus activity

Human, horse and avian sera were tested using an enzyme linked immunosorbent assay (ELISA) technique designed for detection of IgM antibodies specific for the viruses mentioned above. Suspect positives were submitted to the Centers for Disease Control and Prevention (CDC) for confirmation.

Active Surveillance for Human Cases of Disease

Human arboviral surveillance activities consisted of standard weekly reporting by physicians in addition to statewide telephone contact with pre-designated hospitals on a weekly basis. Eight human sera were analyzed: reports indicated that there were no human arboviral cases in Missouri. Illinois had two cases of SLE.

Active Surveillance for Equine Cases of Disease

Thirteen veterinarians throughout the state were contacted by telephone on a weekly basis. All reports indicated no arboviral activity in horses in Missouri during this period. Four equine sera were analyzed. It should be mentioned that large numbers of horses are vaccinated against these diseases.

Active Surveillance for Arboviral Activity in Sentinel Chicken Flocks

Five sentinel chicken flocks (ten chickens per flock) were strategically placed throughout the state in the following counties: Clay, Jefferson, Livingston, Marion and Vernon. All chickens were bled on a weekly basis from May–October 1995 by contract or local health personnel. Eight hundred and thirty one (831) chicken sera were analyzed and no IgM antibodies specific for SLE or WEE were detected. This indicated that arboviral activity was not occurring in these areas.

Active Surveillance for Arboviral Activity in Wild Birds

Trapping of wild birds began on May 22, 1995 via a contract with the Wild Animal Damage Control Unit of the United States Department of Agriculture. A total of 1,042 wild birds comprising 15 species were collected from 15 counties (Andrew, Bollinger, Buchanan, Cape Girardeau, Clay, Clark, Cole, Jackson, Marion, Mercer, Putnam, St. Charles, Ste. Genevieve, St. Louis and Warren) through October 20, 1995. The majority of birds were English Sparrows (91%), the Common Grackle (3.4%) and European Starlings (2.0%). **Sera from three birds in Marion county tested positive for SLE during the last week in September.** This indicates that arboviral activity was beginning to occur in birds in Missouri.

Arboviral Surveillance in Vector Mosquito Population

The earliest adult mosquito collections began on May 16, 1995 and all areas were fully operational by the second week of June. Trapping was accomplished with CO_2 baited CDC and EVS Light Traps, Reiter Gravid Traps and hand collection at selected resting stations by aspirator. Collection areas included the Mississippi River flood plain from Hannibal south to Cape Girardeau, the western area of the Missouri River flood plain from north of St. Joseph to the eastern boundary of Kansas City and southwest Missouri, primarily the Springfield area. Vector mosquito populations were considerably higher in 1995 than in 1994. By August 1, 1995, the number of vector mosquitoes collected was almost double the number collected during the same time period in 1994. Two periods of hot dry weather at the end of July and mid-August 1995 decimated the vector mosquito population. This was followed by early cool temperatures which prevented a resurgence of vector mosquito populations.

The Virology Laboratory at Southeast Missouri State University provided analysis for WEE, SLE and LAC virus in vector mosquitoes. There were 4,064 pools of adult mosquitoes tested for WEE, SLE and LAC by antigen capture ELISA. Pools included 91,843 specimens of *Culex pipiens*, *Culex restuans*, *Culex salinarius*, *Culex tarsalis*, *Aedes triseriatus* and *Aedes albopictus*. All tests were negative, indicating that arboviral activity was not occurring or could not be detected in mosquitoes in these areas.

Nuisance adult mosquito populations were almost double that of the 1994 season, with 54,606 mosquitoes collected that year versus 93,203 collected in 1995. The nuisance mosquitoes caught in the light traps were saved for species composition and population studies. Through the season, 67,653 specimens comprising 22 species were identified. Five species accounted for 97 percent of the total: *Aedes vexans* (50.5%), *Culex erraticus* (16%), *Psorophora columbiae* (11%), *Aedes trivittatus* (10%) and *Anopheles quadrimaculatus* (9%).

The floods of 1993 and 1995 have set the scenario for mosquito-borne diseases

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Recommended Childhood Immunization Schedule – United States, January - June 1996

Reprinted from the Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report (MMWR), Jan. 5, 1996, Volume 44, Nos. 51 & 52.

In January 1995, the recommended childhood immunization schedule was published in the MMWR following issuance by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics and the American Academy of Family Physicians.[1] See Figure 1 on page 8 of this issue. This schedule was the first unified schedule developed through a collaborative process among the recommending groups, the pharmaceutical manufacturing industry and the Food and Drug Administration. This collaborative process should assist in maintaining a common childhood vaccination schedule and enabling further simplification of the schedule. This notice presents the recommended childhood immunization schedule for January–June 1996 to incorporate licensure of varicella zoster virus vaccine (Var) and recommendations for adolescent hepatitis B vaccination. OPV remains the recommended vaccine for routine polio vaccination in the United States. IPV is recommended for persons with compromised immune systems and their household contacts and is an acceptable alternative for other persons. ACIP is developing recommendations for expanded use of IPV in the United States.

General Changes

Footnotes have been shortened and simplified wherever possible. For detailed information and specific recommendations for administration of vaccines, practitioners should consult the Report of the Committee on Infectious Diseases (Red Book)[2], the vaccine-specific recommendations of the ACIP and the official manufacturers' package inserts or the Physicians' Desk Reference (PDR).[3]

Date

The schedule is dated January–June 1996, and will be republished in July 1996 to revise or add recommendations and/or to include any changes resulting from licensure of new vaccines. Publishing an updated schedule will permit providers to be certain they are using the most current schedule.

Format Changes

A column has been added to the figure for age 1 month to indicate the second dose of hepatitis B vaccine may be given to infants as early as age 1 month. Shaded bars indicate ages at which adolescents should receive "catch-up" vaccinations if they have not received vaccinations before and, for chickenpox, lack a reliable history of the disease.

Vaccine Recommendation Changes

Hepatitis B, infant—Because of the availability of different formulations of hepatitis B vaccine, doses are presented in micrograms rather than volumes. In addition, the footnote includes recommendations for vaccination of infants born to mothers whose hepatitis B surface antigen status is unknown.

Hepatitis B, adolescent—A bar has been added to indicate that the three-dose series of hepatitis B vaccine should be initiated or completed for adolescents aged 11–12 years who have not previously received three doses of hepatitis B vaccine.

Poliovirus—A footnote has been added to indicate that, although oral poliovirus vaccine (OPV) is recommended for routine vaccination, inactivated poliovirus vaccine (IPV) is indicated for certain persons (i.e., those with a compromised immune system and their household contacts) and continues to be an acceptable alternative for other persons. The schedule for IPV is included in the footnote.

Measles-mumps-rubella vaccine—The footnote has been changed to indicate that although the second dose of measles-mumps-rubella vaccine is routinely administered at age 4–6 years or at age 11–12 years, it may be administered at any visit if at least one month has elapsed since receipt of the first dose.

Varicella zoster virus vaccine (Var)—Var was licensed in March 1995 and has been added to the schedule. This vaccine is recommended for all children at age 12–18 months. The footnote indicates that it may be administered to susceptible persons any time after age 12 months, and that it should be given at age 11–12 years to previously unvaccinated persons lacking a reliable history of chickenpox.

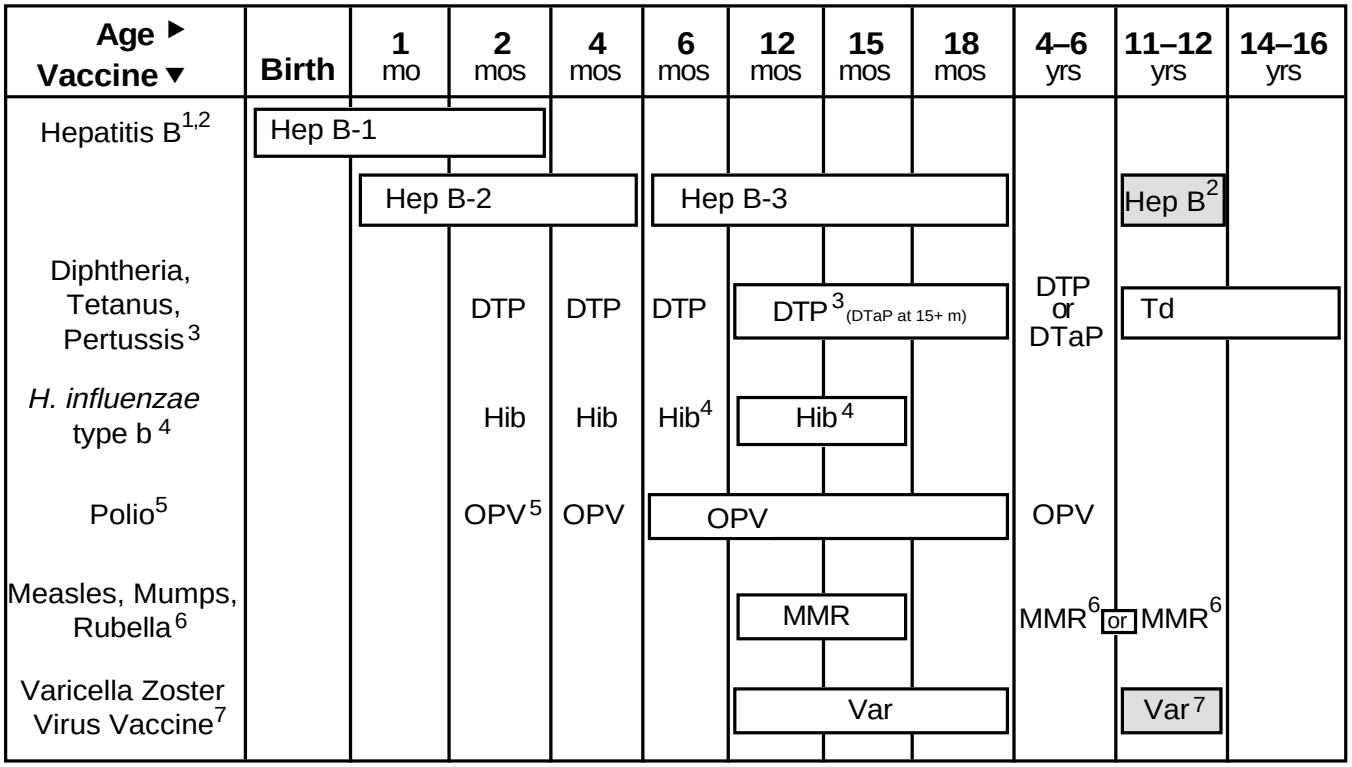
REFERENCES:

1. CDC. Recommended childhood immunization schedule—United States, January 1995. MMWR 1995;43: 959–60.
2. American Academy of Pediatrics. Active and passive immunization. In: Peter G, ed. 1994 Red book: report of the Committee on Infectious Diseases. 23rd ed. Elk Grove Village, Illinois: American Academy of Pediatrics, 1994:1–67.
3. Medical Economics Data. Physicians' desk reference. 49th ed. Montvale, New Jersey: Medical Economics Company, Inc., 1995.

IMMUNIZE: **Five Visits by Two, It's Up To You!**

Figure 1. Recommended Childhood Immunization Schedule – United States, January - June 1996.

Vaccines are listed under the routinely recommended ages. Bars indicate range of acceptable ages for vaccination. Shaded bars indicate catch-up vaccination: at 11–12 years of age, hepatitis B vaccine should be administered to children not previously vaccinated, and Varicella Zoster Virus vaccine should be administered to children not previously vaccinated who lack a reliable history of chickenpox.



Approved by the Advisory Committee on Immunization Practices (ACIP), American Academy of Pediatrics (AAP), and American Academy of Family Physicians (AAFP).

[1] **Infants born to HBsAg-negative mothers** should receive 2.5 µg of Merck vaccine (Recombivax HB) or 10 µg of SmithKline Beecham (SB) vaccine (Engerix-B). The 2nd dose should be administered ≥1 month after the 1st dose.
Infants born to HBsAg-positive mothers should receive 0.5 mL hepatitis B immune globulin (HBIG) within 12 hours of birth, and either 5 µg of Merck vaccine (Recombivax HB) or 10 µg of SB vaccine (Engerix-B) at a separate site. The 2nd dose is recommended at 1–2 months of age and the 3rd dose at 6 months of age.
Infants born to mothers whose HBsAg status is unknown should receive either 5 µg of Merck vaccine (Recombivax HB) or 10 µg of SB vaccine (Engerix-B) within 12 hours of birth. The 2nd dose of vaccine is recommended at 1 month of age and the 3rd dose at 6 months of age.

[2] Adolescents who have not previously received 3 doses of hepatitis B vaccine should initiate or complete the series at the 11–12 year-old visit. The 2nd dose should be administered at least 1 month after the 1st dose, and the 3rd dose should be administered at least 4 months after the 1st dose and at least 2 months after the 2nd dose.

[3] DTP4 may be administered at 12 months of age, if at least 6 months have elapsed since the DTP3. DTaP (diphtheria and tetanus toxoids and acellular pertussis vaccine) is licensed for the 4th and/or 5th vaccine dose(s) for children aged ≥15 months and may be preferred for these doses in this age group. Td (tetanus and diphtheria toxoids, adsorbed, for adult use) is recommended at 11–12 years of age if at least 5 years have elapsed since the last dose of DTP, DTaP, or DT.

[4] Three *H.influenzae* type b (Hib) conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB [Merck]) is administered at 2 and 4 months of age, a dose at 6 months is not required. After completing the primary series, any Hib conjugate vaccine may be used as a booster.

[5] Oral poliovirus vaccine (OPV) is recommended for routine infant vaccination. Inactivated poliovirus vaccine (IPV) is recommended for persons with a congenital or acquired immune deficiency disease or an altered immune status as a result of disease or immunosuppressive therapy, as well as their household contacts, and is an acceptable alternative for other persons. The primary 3-dose series for IPV should be given with a minimum interval of 4 weeks between the 1st and 2nd doses and 6 months between the 2nd and 3rd doses.

[6] The 2nd dose of MMR is routinely recommended for 4–6 years of age or at 11–12 years of age, but may be administered at any visit, provided at least 1 month has elapsed since receipt of the 1st dose.

[7] Varicella zoster virus vaccine (Var) can be administered to susceptible children any time after age 12 months of age. Unvaccinated children who lack a reliable history of chickenpox should be vaccinated at the 11–12 year-old visit.

NOTE: Although the U.S. Recommended Childhood Immunization Schedule asserts that the second dose of measles, mumps and rubella (MMR) vaccine may be given at either 4–5 years or at 11–12 years of age, Missouri law requires a second measles vaccination prior to school entry.

At present, varicella immunization is not required in Missouri pending published ACIP recommendations for use of this vaccine.

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Division of Environmental Health and Epidemiology Telephone and HOTLINE Numbers

AIDS HOTLINE	(800) 533-2437
Childhood Lead Poisoning Program	(800) 575-9267
Communicable Disease Bulletin Board	(800) 213-9723
	(573) 526-5324
	(573) 526-7668
Communicable Disease Consultation	(573) 751-6113
Communicable Disease FAX on Demand	(800) 210-6225
	(573) 526-7668
Communicable Disease Reporting	(800) 392-0272
Community Environmental Health	(573) 751-6095
Division of Environmental Health and Epidemiology	(573) 751-6080
Environmental Epidemiology	(800) 392-7245
	(573) 751-6102
Immunization	(573) 751-6133
Immunization Tracking System (MITS)	(800) 699-2313
Occupational Fatality HOTLINE	(800) 392-7245
Office of Epidemiology	(573) 751-6477
Radiological Health	(573) 751-6160
Radon HOTLINE	(800) 669-7236
Sexually Transmitted Diseases/HIV	(800) 359-6259
Tuberculosis Control	(800) 611-2912
	(573) 751-6122
Vaccines For Children Program	(800) 219-3224
Veterinary Public Health	(573) 751-6136

Bureau of Environmental Epidemiology Emergency Response Involvement – Transportation of Radioactive Material

Gary McNutt
Bureau of Environmental Epidemiology

The Department of Health, by statute, is required to respond to all radiation emergencies. The department is also required to coordinate its radiation emergency response activities and plans with the State Emergency Management Agency, the Department of Natural Resources and other agencies.

The Bureau of Environmental Epidemiology has been assigned the responsibility for responding to radiological emergencies and incidents. While emergency response planning at Callaway and Cooper nuclear power plants plays a major role in the bureau's emergency activities, the bureau is also responsible for responding to other emergencies which involve radiation.

A radiation accident/emergency situation is characterized by unintended intense radiation fields or by the uncontrolled release of radioactive materials. Radiation accidents can occur anywhere that radiation or radioactive materials are used or transported: industry, medical facilities, isotope production facilities, research facilities and nuclear reactor sites.

The period during which radioactive material is most vulnerable to mishap is while it is being transported. Millions of packages of radioactive material are shipped within the United States each year with about half of the packages designated for medical and research applications. For the most part, these medical shipments contain minute quantities of radionuclides and are packed in specially designed containers.

At this time, Missouri is included in a major shipping route for future radioactive waste shipments from the eastern half of the United States to waste disposal facilities in New Mexico and Nevada. Shipments could begin as early as 1998. At its peak, hundreds of shipments of radioactive waste a year would be transported through Missouri. The Department of Energy is currently working on plans to coordinate transportation of these materials with the state and to provide training to emergency response personnel along the corridor.

Missouri was a shipment corridor for radioactive waste from the clean up of the Three Mile Island nuclear power plant. Bureau personnel were involved in surveying and escorting the first Three Mile Island waste shipment across the state and conducted radiation surveys of all shipments as they entered and left the state over a three-year shipment period.

There is also over one million cubic yards of contaminated material in the St. Louis area, awaiting disposal. Clean-up of some of the waste has already begun with plans to ship the material to a waste disposal site in Utah.

We have responded to several incidents involving vehicles transporting radioactive material. These have ranged from minor accidents to overturned vehicles and vehicles which have caught fire and burned with radioactive materials inside. Fortunately, none of these accidents have resulted in a breach of containment or a release of radioactive materials to the environment.

As shipments of radioactive material and waste increase, so does the need to maintain adequate response capabilities. The Bureau of Environmental Epidemiology will be working with the State Emergency Management Agency to train additional state personnel, from both the Department of Health and the Department of Natural Resources, to respond to accidents or incidents involving radioactive materials.

If you have questions about emergency response as it relates to transportation of radioactive material in Missouri, please contact the Bureau of Environmental Epidemiology at (573) 751-6102.

Mosquito-Borne Disease Surveillance

(continued from page 6)
for the next four to six years. With the funding from the emergency flood grant, Missouri was able to implement three prevention surveillance systems: wild bird surveillance, sentinel chicken flock surveillance and mosquito surveillance. By conducting these surveillance programs, a window of opportunity is presented which allows for action to be taken to prevent outbreaks of disease in human populations. These programs were operated in 1993, 1994 and 1995. Unfortunately, grant funds were terminated on October 20, 1995.

Mosquito-borne disease outbreaks normally occur three to four years after a major flood, after there is amplification of the virus in the environment. Based on the fact that Iowa found SLE in a sentinel chicken flock and Illinois had two human cases of SLE along with SLE activity in wild birds in Missouri, it would appear that 1996 has the potential for an abundance of SLE activity. This of course is predicated on the assumption that climatic conditions will produce an abundance of vector mosquitoes.

Six Common Misconceptions About Immunization and How to Respond to Them

Anita Vonderahe
Bureau of Immunization

Practitioners giving immunizations will encounter patients who have reservations about getting immunizations for themselves or their children. There are many reasons for opposition to immunization. The purpose of this article is to address common misconceptions so that immunization providers can respond with accurate information that will enable parents to make informed decisions about immunizing their children.

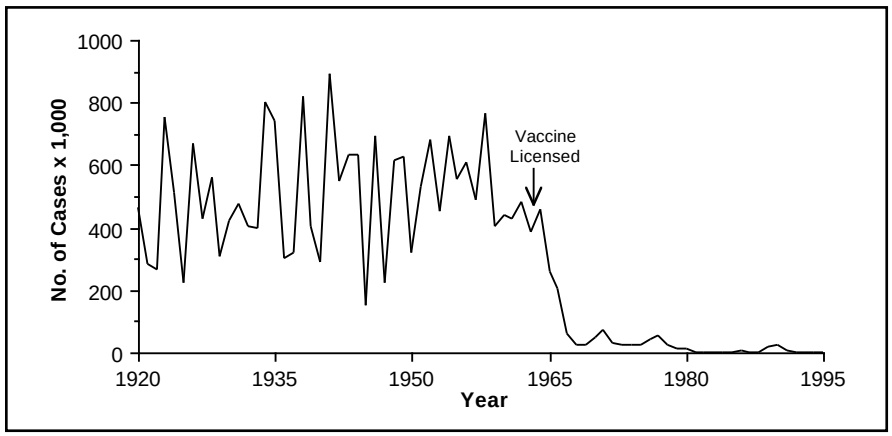

Figure 1. Reported measles cases, United States, 1920 to present.

1. Diseases had already begun to disappear before vaccines were introduced.

While improved socioeconomic conditions have undoubtedly had an indirect impact on disease, looking at the actual incidence of disease over the years can leave little doubt of the significant direct impact vaccines have had, even in modern times. Figure 1 shows the reported incidence of measles from 1920 to the present. While there were periodic peaks and valleys throughout the years, the real permanent drop coincided with the use of measles vaccine beginning in 1963. Reported incidence of other vaccine-preventable diseases show a roughly similar pattern.

Another good example is Hib vaccine. Hib disease was prevalent until just a few years ago, when conjugate vaccines that could be used for infants were developed. Since socio-economic conditions have not improved significantly since 1990, it is hard to attribute the virtual disappearance of Hib disease in children (from an estimated 20,000 cases a year in the early 1980's to 1,419 cases in 1993) to anything other than the vaccine.

Of immediate interest is the major epidemic of diphtheria in recent years in the former Soviet Union. Low primary immunization rates for children and lack of booster immunizations for adults have resulted in an increase from 839 cases in 1989 to nearly 50,000 cases and 1,700 deaths in 1994, with the number of cases increasing by two to ten fold each year.

2. The majority of people who get a disease have been vaccinated.

While the number of vaccinated individuals in an outbreak often outnumber those who were not vaccinated, this does not mean that vaccines are not effective. Two factors explain this apparent paradox. First, no vaccine is 100 percent effective. To make vaccines safer than the disease, the bacteria or virus is killed or weakened. Most routine childhood vaccines have efficacy in the 85–95 percent range. Second, in a country like the United States, the people who have been vaccinated vastly outnumber those who have not. Here is an example to illustrate how these two factors work together to result in outbreaks where the majority of cases have been vaccinated:

In a high school of 1,000 students, none has ever had measles. All but five of the students have had two doses of measles vaccine, and so are fully vaccinated. The entire student body is exposed to measles and every susceptible student becomes infected. The five unvaccinated students will be infected, but of the 995 who have been vaccinated, we would expect a small percentage (1–2%) not to respond to the vaccine, which we know to be about 98 percent effective when used as recommended. In this class, seven students did not respond to the vaccine, and they, too, became infected. Therefore, 7 of 12, or about 58 percent, of the cases occurred in students who are fully vaccinated. Looking at it another way, 100 percent of the children who were not vaccinated got measles, compared with less than one percent of those who were. Measles vaccine protected more than 99 percent of the vaccinated students; if nobody in the class had been vaccinated, there would probably have been hundreds of cases of measles.

3. There are hot lots of vaccine that have been associated with more adverse events and death than others.

The concept of a hot lot of vaccine is based on the presumption that the more reports to Vaccine Adverse Event Reporting System (VAERS) a vaccine is associated with, the more dangerous the vaccine in that lot; and that by consulting a list of the number of reports per lot, a parent can identify vaccine lots to avoid. This presumption is misleading for two reasons. First, VAERS is a system for reporting events that are temporally associated with receipt of vaccine. VAERS reports do not mean that the vaccine caused the event. Statistically, a certain number of serious illnesses can be expected to occur by chance alone

among children recently immunized. While vaccines are known to cause minor temporary side effects, there is little evidence linking immunization with permanent health problems or death. Because an adverse event has been reported to VAERS does not mean it was caused by a vaccine.

Second, vaccine lots are not the same. The sizes of vaccine lots might vary from several hundred thousand doses to several million, and some are in distribution much longer than others. Naturally a larger lot or one that is in distribution longer will be associated with more adverse events simply by chance. Also, more coincidental deaths are associated with vaccines given in infancy than later in childhood, since the death rates for children are highest during the first year of life.

Reviewing lists of hot lots will not help parents identify the best or worst vaccines for their children. To date, no vaccine lot in the modern era has been found to be unsafe on the basis of VAERS reporting.

Every vaccine manufacturing facility and vaccine product is licensed by the FDA and safety tested by the manufacturer. The results of these tests are reviewed by the FDA to ensure their safety.

4. Vaccines cause many harmful side effects, illnesses, and even death.

Vaccines are actually very safe, despite implications to the contrary in much anti-vaccine literature. Most vaccine adverse events are minor and temporary, such as a sore arm or mild fever. These can often be controlled by taking acetaminophen before or after immunization. More serious adverse events rarely occur and some are so rare that risk cannot be accurately assessed. As for vaccines causing death, so few deaths can plausibly be attributed to vaccines that it is hard to assess the risk statistically. Each death reported to VAERS is thoroughly examined to ensure that it is not caused by a vaccine-related problem, and little or no evidence suggests that vaccines have contributed to any of the reported deaths. The Institute of Medicine in its 1994 report states that the risk of death from vaccines is extraordinarily low.

Looking at risk alone is not enough. One must always look at both risks and benefits. Even one serious adverse effect in a million doses of vaccine cannot be justified if there is no benefit from the immunization. However, if there were no vaccines, there would be many more cases of disease, and along with them, more serious side effects and deaths.

5. Vaccine-preventable diseases have been virtually eliminated from the United States, so there is no need to immunize.

While immunizations have enabled us to reduce most vaccine-preventable diseases to very low levels in the United States, some of them are still quite prevalent, even epidemic, in other parts of the world. Travelers unknowingly bring these diseases into the United States, and if we were not protected by immunizations, these diseases could quickly spread throughout the population. At the same time, the relatively few cases we currently have in the United States could very quickly become more abundant without the protection from vaccines.

6. Giving a child multiple immunizations for different diseases at the same time increases the risk of harmful side effects and can overload the immune system.

Children are exposed to many foreign antigens every day. Available scientific data show that simultaneous immunization with multiple vaccines has no adverse effects on the normal childhood immune system.

A number of studies have been conducted to examine the effects of giving various combinations of vaccines simultaneously. These studies have shown that the recommended vaccines are as effective in combination as they are individually, and that such combinations cause no greater risk for adverse side effects.

There are two practical factors in favor of giving a child several immunizations during the same visit. First, immunizing children as early as possible will give them protection during the vulnerable early years of life. Second, giving several immunizations at the same time will mean fewer office visits, which saves parents both time and money, and may be less traumatic for the child.

Conclusion

Vaccines are safe and effective against potentially devastating diseases. Each year in the United States, numerous children die or are severely injured by vaccine-preventable diseases. Potential side effects of vaccines are minimal in comparison to the benefits to be gained from immunization. The future eradication of such diseases will be dependent on having a highly immunized population.

REFERENCE:

CDC. Six common misconceptions about vaccination and how to respond to them. January 1996.

Epidemiology and Prevention of Vaccine-Preventable Diseases

The Centers for Disease Control and Prevention will present the satellite course, "Epidemiology and Prevention of Vaccine-Preventable Diseases" on four consecutive Fridays this Spring from 11:00 a.m.–2:30 p.m. CST. The dates are May 31, June 7, June 14 and June 21, 1996. The course will be sponsored in Missouri by the Bureau of Immunization, Missouri Department of Health.

For more information about the course, or for site locations, contact the immunization representative located in each of the district health offices or the Bureau of Immunization at (573) 751-6133.

The State Milk Board – Why Milkborne Disease is Absent in Missouri

Barry J. Drucker, R.S., M.A., M.P.H.
St. Louis County Department of Health

Terry S. Long, B.S., Ag.E., R.S.
Missouri State Milk Board

Man should go out of this world as he came in—chiefly on milk.
Sir William Osler

Milk is a paradox. Arguably the most nutritious food, it is also one of the most perishable, and is an excellent vehicle of infection.[1,2] Although it is the first food of human life, in the last four decades alone it has been implicated in over 100 deaths and tens of thousands of illnesses.[1,2,3] In 1985, for example, a dairy processing plant in the Chicago area was the source for the largest outbreak of salmonellosis ever recorded in the United States. Several deaths resulted from approximately 200,000 cases, over 16,000 of which were culture-confirmed.[3]

Thankfully, that kind of tragic incident has not occurred in Missouri. In the 23 years since the creation of the Missouri State Milk Board, no milk produced in Missouri has been associated with a single disease outbreak, and there's been a lot of milk under the bridge since then—about 75 billion gallons!

The board is a public-private partnership unique in the history of milk regulation, and one could say that it represents the culmination of centuries of evolution. Since the Viennese first attempted to regulate dairy products in 1599[1], people have been seeking a system to regulate nature's most perishable food. In America, as the dairy industry began to industrialize in the 1800's, the mass production and distribution of milk and dairy products led to widespread outbreaks of milkborne disease.[2]

Government regulators responded to that challenge with a patchwork of contradictory local and state dairy regulations. These efforts culminated in the adoption of the Pasteurized Milk Ordinance (PMO) in 1965. The concern about duplication of efforts stimulated cooperation between states which gave rise to the National Conference of Interstate Milk Shippers (NCIMS), an organization that eliminated the need for receiving states to verify sanitary standards at the site of milk production.[4] This interstate coalition not only served public health, but was also of economic benefit to both consumers and industry. As a result, both health and economic considerations induced states to adopt federal standards and centralize their milk programs.

Most states designated the task of centralized dairy regulation to their Department of Agriculture. Missouri, however, took an extra step to ensure optimal cooperation among government, industry and consumers by creating a board in 1973 which mirrors the diversity of the state. No more than six of the twelve board members can be from the same political party. Ten of the members are appointed by the governor and confirmed by the senate, of which four must be Grade A dairy farmers, four must be members of local health departments in the state and the remaining two must represent processor and consumer interests. The two remaining members are from the departments of Health and Agriculture.[5]

Enforcement of regulations concerning fluid milk and fluid milk products is accomplished by contractual arrangements with Kansas City, Springfield and St. Louis County. These jurisdictions oversee the nearly 3,000 daily farms and approximately 20 processing plants in Missouri. These contractees inspect farms within their "milkshed" at least twice a year, collecting samples at least four times every six months to be analyzed for the presence of bacteria, mastitis and added water. Sampling for antibiotics is more frequent; sampling for pesticides less frequent. If certain levels of these contaminants are found, the violator's product is withheld from the market and penalities may be assessed.

Agents of the Department of Health conduct surveys at least every 24 months. Also, the FDA inspect the farms and processing plants at random intervals, checking on the contractee's ability to properly interpret and enforce the federal PMO. If the state gives an establishment a score of less than 90%, it leads to "de-listing," or loss of its NCIMS rating. Without this rating, the milk can neither be sold as grade A in the state of Missouri, nor in interstate commerce. While redundant, these inspections are far from perfunctory.

Given these numerous levels of authority and the various interests of its members, one might expect the Missouri State Milk Board to be contentious and chaotic. Typically, the reverse is true and the public health is well-served. In fact, cooperation between board members has averted more than one potential disaster. In 1984, for example, a dishonest dealer had misrepresented seed corn treated with the carcinogenic pesticide heptachlor as animal feed, selling the toxic material to dairy producers in southern Missouri. Alerted to this hazard by the board, state and contractee inspectors worked diligently collecting samples for laboratory analyses. After identifying the affected producers, their milk was withheld from the human food chain, thus protecting the health of the consuming public. As a result of the board's vigilance, not a drop of heptachlor contaminated milk or milk products reached the consumer.

Consumers must be vigilant, too. The Institute of Medicine has predicted that the number of people age 65 and older is expected to reach 50 million by the year 2020, and the most rapid population increase in the next decade will be among

those over 85 years of age.[6] As disease and old age suppress their immune systems, their susceptibility to infectious diseases, including those borne by milk, increases. However, a "second public health revolution," emphasizing chronic disease control has leveled funding for these more traditional communicable disease programs.[7,8,9] With a fee structure substantially unchanged since 1973—a period of time that has included several years of hyperinflation—the Missouri State Milk Board has maintained its primary goal of disease prevention

We don't want anyone to "go out of this world" just because of a glass of milk.

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State Public Health Laboratory Report

Newborn Screening—Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Sep 95	Oct 95	Total YTD
Specimens Tested	10,002	10,724	101,075
Initial (percent)	63.8%	63.7%	64,163
Repeat (percent)	36.2%	36.3%	36,912
Specimens: Unsatisfactory	111	130	1,449
HT Borderline	901	1,126	8,576
HT Presumptive	32	45	356
PKU Borderline	5	7	161
PKU Presumptive Positive	1	2	12
GAL Borderline	124	91	1,420
GAL Presumptive Positive	3	3	22
FAS (Sickle cell trait)	77	67	801
FAC (Hb C trait)	20	32	299
FAX (Hb variant)	9	13	127
FS (Sickle cell disease)	1	0	16
FSC (Sickle C disease)	1	3	11
FC (Hb C disease)	0	1	8

	Nov 95	Dec 95	Total YTD
Specimens Tested	9,521	9,156	119,752
Initial (percent)	63.4%	64.7%	76,128
Repeat (percent)	36.6%	35.3%	43,624
Specimens: Unsatisfactory	143	134	1,726
HT Borderline	815	1,141	10,532
HT Presumptive	50	61	467
PKU Borderline	7	8	176
PKU Presumptive Positive	0	0	12
GAL Borderline	60	78	1,558
GAL Presumptive Positive	3	3	28
FAS (Sickle cell trait)	89	74	964
FAC (Hb C trait)	13	25	267
FAX (Hb variant)	8	6	141
FS (Sickle cell disease)	1	3	20
FSC (Sickle C disease)	0	2	13
FC (Hb C disease)	0	1	9

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

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The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by Mahree Skala, MA, Deputy Director, of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

Celebrate National Public Health Week

The Missouri Public Health Association has taken the lead in establishing a committee to determine how best to celebrate National Public Health Week scheduled for April 1-7, 1996. The theme, "Celebrating Success," will encourage public health professionals and agencies at all levels to showcase their many accomplishments in protecting individual and community health.

Public Health has a great deal to celebrate including its efforts to :

- ensure clean water and safe food supplies
- prevent chronic diseases and injuries
- help keep Missouri homes free from toxic hazards like lead and radon
- protect Missouri's children through immunizations, fluoridation programs and WIC services
- help expectant mothers deliver healthy babies
- monitor and assess illness and deaths occurring in our communities.

While membership on this multi-agency committee is still evolving, the following persons have been identified as participants through the Missouri Public Health Association. If you have any suggestions or want to learn more about National Public Health Week, please contact one of the following individuals:

Carla Colett	Springfield/Greene County Health Department	Ph: (417) 864-1685
Chuck Espinoza	Kansas City Health Department	Ph: (816) 561-1044
Owen Smith	Pettis County Health Department	Ph: (816) 827-1130
Crystal Colman	St. Louis County Health Department	Ph: (314) 854-6823
Jan Morrow	Ripley County Health Center	Ph: (573) 996-2181
George Young	Randolph County Health Department, Home Care and Hospice	Ph: (816) 263-6643 Ex 3060
Nanci Gonder	Office Of Public Information, Missouri Department of Health	Ph: (573) 751-6003
Sue Burton	Professional Sanitarians Association,Southwest District Health Office	Ph: (417) 895-6900
Lorna Wilson	Missouri Association of Local Public Health Agencies	Ph: (573) 659-8828

Missouri EPIDEMIOLOGIST

Volume XVIII, Number 2 *March-April 1996*

Missouri Department of Health Policy to Reduce the Risk of Perinatal HIV Transmission in Missouri

Introduction

Perinatal transmission of human immunodeficiency virus (HIV) from an infected mother to her infant is a tragic event that is continuing to occur in Missouri. At the present time, essentially all new HIV infections in children are acquired in this manner. Given current limitations in the treatment of HIV disease, infants infected with this virus face the prospect of recurrent serious illnesses involving considerable suffering and eventually death. In addition, the average lifetime cost of care for a single HIV-infected child is very substantial (with estimates ranging from $280,000[1] to almost $420,000[2]), resulting in significant financial burden for individuals and for society.

Increased understanding of the mechanisms of perinatal transmission of HIV and the discovery of an effective therapeutic intervention have provided the opportunity to significantly reduce the occurrence of mother-to-infant transmission. Of particular importance are the results from the AIDS Clinical Trials Group (ACTG) 076 study, which indicated that administration of zidovudine (ZDV, AZT) to a selected group of pregnant women infected with HIV and to their newborns reduced the risk for perinatal HIV transmission by approximately two-thirds, from approximately 26 percent to 8 percent.[3] With the availability of a specific therapy to significantly reduce perinatal transmission risk, it now becomes even more important for all pregnant women to receive appropriate prenatal care and be offered the opportunity to know their HIV status. In addi-

(continued on page 2)

A special message from the director.....

During the past year, the Missouri Department of Health has worked with other organizations and individuals to develop a clear understanding of what needs to be done to reduce perinatal transmission of HIV in Missouri. As part of this process, we examined the epidemiology of HIV infection in women of childbearing age and in their infants, and we conducted a survey of provider beliefs and practices relative to the prevention of perinatal HIV infection. We surveyed the medical literature, and studied the prevention recommendations recently issued by the Centers for Disease Control and Prevention and by several professional organizations. In addition, we received input from numerous individuals, including medical providers and women infected with HIV. The result of this process is "**Missouri Department of Health Policy to Reduce the Risk of Perinatal HIV Transmission in Missouri**." I strongly encourage all physicians and other health care professionals who provide care to women of childbearing age to read this document and ensure that its recommendations are implemented within their practice settings.

Coleen Kivlahan, M.D., M.S.P.H.
Director
Missouri Department of Health

Inside this Issue...

(continued from page 1)
tion, it is essential that all providers of care to women of childbearing age be knowledgeable about HIV disease and the means for reducing the risk of transmission.

This document was developed by a working group established by the Missouri Department of Health (DOH). Members included, besides DOH staff, professionals from the Missouri Perinatal Association, Washington University in St. Louis, and St. Louis University. These individuals are currently involved in the care of HIV-infected women and in the development of public policy relating to pregnant women and their infants. The document presents a set of basic recommendations for preventing perinatal transmission of HIV in Missouri. These recommendations were developed after a year-long series of meetings which included input from medical providers, HIV-infected women, other members of the HIV/AIDS community, the City of St. Louis Department of Health and Hospitals and the Kansas City Health Department.

Recommendations to Prevent Perinatal Transmission of HIV

Pregnant Women

1. Each pregnant woman should have ready access to appropriate prenatal care, and such care should begin as early as possible in her pregnancy.

2. Prenatal care should routinely include risk assessment for HIV infection and other sexually transmitted diseases (STDs). Testing for syphilis and hepatitis B infection should be performed as required by Missouri law (210.030, RSMo).

3. Prenatal care should routinely include HIV education and counseling, and each pregnant woman should be encouraged to undergo voluntary HIV testing. HIV education, counseling and voluntary testing should be offered at the initial prenatal visit. Uninfected pregnant women who continue to practice high-risk behaviors (e.g., injecting-drug use and/or unprotected sexual contact with an HIV-infected or high-risk partner) should be encouraged and assisted to avoid further exposure to HIV, and to be retested for HIV in the third trimester of pregnancy.

4. If a pregnant woman is infected with HIV, the most recent United States Public Health Service (USPHS) recommendations to reduce the risk of perinatal HIV transmission[4] and to prevent the occurrence of opportunistic infections[5] should be followed. Each HIV-infected pregnant woman should be informed of the substantial benefit and potential risks of ZDV administered during pregnancy and the neonatal period. Discussion of treatment options should be noncoercive, and the final decision to accept or reject recommended ZDV treatment is the right and responsibility of the woman. A decision not to accept treatment should not result in punitive action or denial of care, nor should ZDV be denied to a woman who decides to receive the regimen.

5. Each HIV-infected pregnant woman (along with any other HIV-infected person, female or male) should be encouraged to accept a referral to the DOH-affiliated HIV/AIDS Service Coordination Program.

6. If a woman has not been tested for HIV during the prenatal period, she should, at the time she presents for delivery, receive counseling and be encouraged to undergo HIV testing. Such testing should be performed at the earliest practical time, but not later than the immediate postpartum period.

7. If a woman continues to choose to not be tested for HIV, she should be informed of the significant benefits to her child's health of knowing her child's infection status, and she should be encouraged to allow the child to be tested. It should be ensured that the mother provides consent with the understanding that a positive HIV test for her child is indicative of infection in herself.

8. HIV-infected mothers should be advised against breastfeeding in order to reduce the risk for HIV transmission to those infants who are uninfected at birth.

9. Before the woman and her infant leave the hospital, arrangements should be made for appropriate, ongoing medical care and other necessary services for both individuals. If the woman is HIV-infected and is not enrolled in the HIV/AIDS Service Coordination Program, she should be encouraged to accept a referral to this program prior to discharge.

Voluntary vs. Mandatory HIV Testing of Pregnant Women

USPHS[6], the American Academy of Pediatrics (AAP)[7,] and the American Medical Association (AMA)[8] have all issued recommendations or reports stating that HIV testing of pregnant women should be voluntary. DOH is in agreement with these statements. Voluntary, as opposed to mandatory, testing of these women is supported by studies which indicate that high test-acceptance levels can be achieved without mandating testing. Mandatory testing may increase the potential for negative consequences of HIV testing and result in some women avoiding prenatal care altogether. In addition, mandatory testing may adversely affect the patient-provider relationship by placing the provider in an enforcing rather than a facilitating role. Providers must act as facilitators to adequately assist women in making decisions regarding HIV testing and ZDV preventive therapy.[6] In addition, if a woman is found to be HIV-infected and chooses to begin ZDV therapy, the issue of compliance with the medication regimen becomes important. The quality of the patient-provider relationship in terms of rapport and level of trust would appear to be a particularly important factor in whether good compliance can be initiated and maintained.

Women of Childbearing Age

1. The most effective way to prevent mother-to-infant transmission of HIV is to prevent the mother from becoming infected. Effective prevention programs and services, which provide women (and men), including adolescents, with appropriate knowledge and skills necessary to avoid infection should be available throughout Missouri.

2. Each woman of childbearing age should be knowledgeable about HIV disease, its means of transmission, and the ways in which such transmission can be prevented. Providers of medical care to these women should utilize all available opportunities to provide HIV education and counseling, and to help those at risk for HIV infection reduce these risks through changes in behavior.

3. All women of childbearing age should have ready access to appropriate medical care. Such care should include the provision of HIV education and counseling, the performance of a risk assessment for HIV and other STDs, the availability of HIV/STD testing whenever indicated, and the provision of family planning services. HIV education and counseling, risk assessment and, where necessary, HIV/STD testing should be repeated at periodic intervals.

4. All women at risk for HIV infection as a result of sexual or needle-sharing behavior should be counseled and strongly encouraged to be tested for HIV.

5. Providers of medical care to women of childbearing age should have appropriate knowledge regarding HIV disease and prevention of HIV transmission. In addition, these providers should have the knowledge and skills necessary to perform HIV risk assessment and HIV risk reduction counseling.

(continued on page 4)

Missouri Perinatal Association Urges Perinatal Health Providers to Follow New Guidelines for HIV Counseling and Testing of All Pregnant Women

As a statewide association representing multi-disciplinary providers of perinatal health services, as well as health care consumers, the Missouri Perinatal Association (MPA) has long been an advocate of health policies and practices that are in the best interests of Missouri women and their families. MPA was represented on the working group that developed the new guidelines for HIV counseling and testing of pregnant women, and wants to take this opportunity to encourage all provides of perinatal health services to adopt these new guidelines into their practices.

It is important to note that these guidelines are comprehensive, speaking to the needs of both women and men, and the protection and treatment of infants and children. The focus is on education and prevention of an illness that can have devastating financial and emotional effects on children, parents, providers and society as a whole.

These guidelines have been carefully discussed and reviewed by Missouri's leaders in perinatal health care, and incorporate the highest level of current knowledge regarding HIV. This has resulted in the establishment of helpful guidelines that providers can use to actually reduce the risk of children contracting HIV through perinatal transmission.

As perinatal health care providers, we are always grateful when research leads to the discovery of new knowledge that can be used to prevent or ameliorate disease. Surely, HIV is one of the most potentially devastating diseases humankind has ever faced. At last we have a new tool to use in our efforts to overcome this disease, and to help prevent its damage to any more children. Please read these guidelines carefully, educate your peers and colleagues about them, and adopt them into your practice. Together we will continue our diligence in holding back this disease in whatever ways are available to us, and continue to gather, examine and share our knowledge until we develop the cure for HIV disease.

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Additional Issues

1. Providers of medical care to adult and adolescent males should furnish HIV education and counseling to their patients. These same providers should perform risk assessment for HIV and other STDs on all patients. Testing for HIV and other STDs should be performed whenever indicated. HIV education and counseling, risk assessment and, where necessary, HIV/STD testing should be repeated at periodic intervals.

2. Medical providers diagnosing HIV infection should report this diagnosis to public health officials as required by DOH rule (19 CSR 20-20.020).

Recommendations From the United States Public Health Service and the American Academy of Pediatrics

USPHS[4,6] and AAP[7] have recently issued recommendations on counseling and voluntary testing of pregnant women, and on the use of ZDV to reduce the risk of perinatal HIV transmission. DOH is in agreement with these guidelines and recommends they be followed by health professionals providing care to women of childbearing age.

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1. Wilfert CM. Mandatory screening of pregnant women for the human immunodeficiency virus. Clin Infect Dis 1994;19:664–6.
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4. CDC. Recommendations of the U.S. Public Health Service Task Force on the use of zidovudine to reduce perinatal transmission of human immunodeficiency virus. MMWR 1994; 43(No. RR-11).
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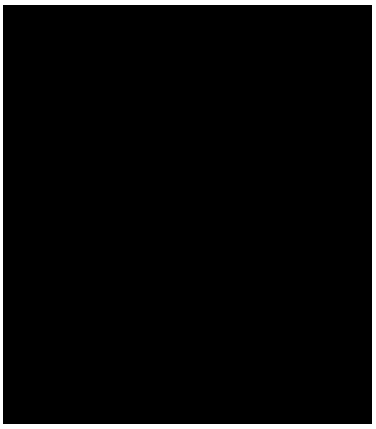
6. CDC. U.S. Public Health Service recommendations for human immunodeficiency virus counseling and voluntary testing for pregnant women. MMWR 1995;44(No. RR-7).
7. Provisional Committee on Pediatric AIDS. Perinatal human immunodeficiency virus testing. Pediatrics 1995; 95:303-7.
8. AMA Council on Scientific Affairs. Maternal HIV screening and treatment to reduce the risk of perinatal HIV transmission: an update report. CSA Rep. 6-A-95, 1995.

Area Code Change from 314 to 573

Effective January 8, 1996, the 314 area code was changed to 573 (except for phone numbers in the St. Louis metropolitan area). This change includes the cities of Jefferson City, Hannibal, Columbia, Fulton, Rolla, Poplar Bluff, Cape Girardeau and Sikeston. A permissive dailing period to get customers acquainted with dialing the new area code is in effect until July 8, after which you must dial the 573 area code. Please review and change any phone listings for the Department of Health accordingly.

New Director for Division of Environmental Health and Epidemiology



Pamela Rice Walker was recently appointed Director, Division of Environmental Health and Epidemiology.

"As public servants, we have a duty to be stewards for Missouri's quality of life," Walker said. "As Department of Health employees, we are striving to improve the health status of all Missourians through policy development and leadership, assessment and assurance of public health services. In our capacity as researchers/interveners we must be accountable to public expectations without sacrificing the rigorous tests our science must meet to be valid."

Ms. Walker has nineteen years combined experience in public health, epidemiology, environmental and natural resource management. She has a B.S. from and is completing her M.P.A. at the University of Missouri-Columbia.

Ms. Walker's most recent accomplishment was to help develop and supervise the Community Health Assessment Resource Team (CHART). CHART is a technical assistance team developed to assist communities improve their health status. There are now 42 community health coalitions utilizing Department of Health secondary data, developing primary data, setting priorities and developing community interventions for the leading health indicators.

Prevention of Perinatal HIV Transmission: Beliefs and Practices of Missouri Prenatal Providers

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Introduction

Results of the AIDS Clinical Trials Group (ACTG) 076 study demonstrated that administration of zidovudine (ZDV, AZT) to HIV-infected pregnant women and their newborns can significantly reduce the risk of perinatal HIV transmission.[1] This is a significant finding which makes it increasingly important for all prenatal providers to identify pregnant women who are infected with HIV and offer them the opportunity for appropriate treatment to reduce the chances they will transmit the virus to their offspring. In early 1995, the Missouri Department of Health, together with health professionals from outside the department, began development of a policy to reduce the risk of perinatal HIV transmission in Missouri. As part of this process, a questionnaire was developed and sent to selected medical providers in the state to assess their current beliefs and practices relative to prevention of perinatally transmitted HIV infection. This report will analyze the responses to this questionnaire from four specific groups of professionals providing care to pregnant women: obstetrician/gynecologists (OB/GYNs), general/family practice physicians (GP/FPs), advanced practice nurses (APNs)[†] and other nurses (ONs).

Methods

A list of Missouri-licensed OB/GYNs (n=621), GP/FPs *who reported delivering infants* (n=157) and APNs *who reported obstetrics/gynecology as an area of interest* (n=489) was obtained from the State Center for Health Statistics. The Missouri Perinatal Association provided from its membership roster a list of additional physicians and nurses who had not been included in the list supplied by the State Center for Health Statistics: OB/GYNs (n=15), GP/FPs (n=23), APNs (n=46) and ONs (n=184). A questionnaire was sent in October 1995 to each of these 1,535 professionals. Because it was felt that some questions, especially those that dealt with current provider practices, might be perceived as sensitive, the survey was conducted anonymously. The respondent was asked not to indicate their name on the questionnaire form, and there was no way to trace a given questionnaire back to the provider who had completed it.

Results

Of the 1,535 questionnaires sent, 378 were returned, for an overall return rate of 24.6 percent. Questionnaires were returned by 153 (24.1%) of 636 OB/GYNs, 46 (25.6%) of 180 GP/FPs, 51 (9.5%) of 535 APNs and 128 (69.6%) of 184 ONs. Each individual was asked on the questionnaire whether he or she had personally provided care or services to pregnant women since the beginning of 1994; only the 303 respondents who indicated that they had provided such care or services (139 OB/GYNs, 44 GP/FPs, 35 APNs and 85 ONs) are included in the analysis which follows. Table 1 indicates the geographic area where these 303 respondents practice.

Table 2 summarizes the experience of these 303 providers with regard to caring for HIV-infected pregnant women. Overall, 76 (25.1%) respondents indicated that they had knowingly cared for one or more such infected women since January 1994.

Table 3 summarizes the responses of the four provider groups to statements related to prevention of perinatal HIV transmission. High percentages of respondents (generally >80%) in each of the provider groups agreed or strongly agreed that childbearing-age women should be evaluated for their HIV risk, and that they should receive HIV education/counseling as a routine part of their care. However, among physician respondents, a much smaller proportion (61.2% of the OB/GYNs and 45.5% of the GP/

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[†] Advanced practice nurses are in middle management, have a teaching or consultant role and/or are nurse practitioners.

Table 1. Prenatal Provider Survey Participants by Geographic Area of Practice and Type of Provider, Missouri, 1995.

Geographic Area of Practice	OB/GYN Physicians		GP/FP Physicians		Advanced Practice Nurses		Other Nurses	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
St. Louis Area*	62	44.6%	1	2.3%	14	40.0%	30	35.3%
Kansas City Area**	26	18.7%	6	13.6%	4	11.4%	17	20.0%
Outstate Missouri	49	35.3%	37	84.1%	16	45.7%	38	44.7%
Unknown	2	1.4%	0	0.0%	1	2.9%	0	0.0%
TOTAL	**139**	**100.0%**	**44**	**100.0%**	**35**	**100.0%**	**85**	**100.0%**

*St. Louis City, St. Louis County and St. Charles County
**Cass, Clay, Jackson, Lafayette, Platte and Ray counties

Table 2. Proportion of Survey Participants Who Have Knowingly Provided Care* to HIV-Infected Pregnant Women by Type of Provider, Missouri, 1995.

Type of Provider	Proportion Who Have Knowingly Provided Care* to HIV-Infected Pregnant Women	
Obstetrician/Gynecologist	29/139	(20.9%)
General/Family Practitioner	3/44	(6.8%)
Advance Practice Nurse	13/35	(37.1%)
Other Nurse	31/85	(36.5%)

*since January 1994

(continued from page 5)

FPs) felt that such education/counseling should be a requirement for providers. Over 90 percent of respondents in each of the provider groups agreed or strongly agreed that all pregnant women should be offered HIV testing as part of their prenatal care, but a much lower percentage (53.2% of OB/GYNs, 38.6% of GP/FPs, 31.4% of APNs and 67.1% of ONs) believed that such testing should be mandatory. High percentages (≥80%) of the physician respondents and the APNs agreed or strongly agreed that ZDV can significantly reduce the risk of perinatal HIV transmission; the percentage of ONs indicating agreement was lower (62.4%). However, much smaller percentages of providers (43.9% of OB/GYNs, 40.9% of GP/FPs, 40.0% of APNs and 54.1% of ONs) felt ZDV treatment of HIV-infected pregnant women should be mandatory.

Providers were asked if they had heard of the ACTG 076 study and its findings.[1] With the exception of the ONs, high proportions responded affirmatively (82.0% of OB/GYNs, 75.0% of GP/FPs and 71.4% of APNs, but only 38.8% of ONs). Among those providers who reported having cared for HIV-infected pregnant women, these percentages were, with the exception of the APNs, even higher (89.7% of OB/GYNs, 100% of GP/FPs, 61.5% of APNs and 51.6% of ONs).

The providers were then asked if they were aware of the August 1994 guidelines from the United States Public Health Service (USPHS) on the use of ZDV to reduce the risk of perinatal HIV transmission.[2] A relatively high percentage of OB/GYNs (69.8%), but lesser percentages of other providers (56.8% of GP/FPs, 51.4% of APNs and 28.2% of ONs) indicated awareness. Among those who reported having cared for HIV-infected pregnant women, the percentage with knowledge of the guidelines was higher for each of the provider groups (82.8% of OB/GYNs, 100% of GP/FPs, 53.8% of APNs and 41.9% of ONs). All respondents who indicated they had knowledge of the guidelines were next asked to respond to the statement that these guidelines represent reasonable recommendations which should generally be followed by prenatal providers. Agreement or strong agreement with this statement was indicated by all providers (90.7% of OB/GYNs, 96.0% of GP/FPs, 100% of APNs and 91.7% of ONs.

Table 3. Percentage of Survey Participants Who Agree or Strongly Agree with Selected Statements on HIV Prevention by Type of Provider, Missouri, 1995.

Statement	OB/GYN Physicians (n = 139)	GP/FP Physicians (n = 44)	Advanced Practice Nurses (n = 35)	Other Nurses (n = 85)
All women of childbearing age should be evaluated for their risk of HIV infection.	82.7%	81.8%	91.4%	88.2%
All pregnant women should receive HIV education/counseling as a routine part of their prenatal care.	78.4%	81.8%	100.0%	98.8%
Providers of prenatal care should be required to provide HIV education/counseling to all of their pregnant patients.	61.2%	45.5%	82.9%	92.9%
All pregnant women should be offered HIV testing by their prenatal provider.	92.1%	90.9%	97.1%	94.1%
HIV testing of all pregnant women should be mandatory.	53.2%	38.6%	31.4%	67.1%
Zidovudine (ZDV, AZT) can significantly reduce the risk of maternal-infant transmission of HIV.	84.9%	81.8%	80.0%	62.4%
Zidovudine (ZDV, AZT) treatment of HIV-postive pregnant women should be mandatory.	43.9%	40.9%	40.0%	54.1%

Table 4. Percentage of Survey Participants Who Routinely Evaluate Their Childbearing-Age Female Patients for Selected HIV-Associated Risk Behaviors by Type of Provider, Missouri, 1995.

Risk Behavior*	OB/GYN Physicians (n = 139)	GP/FP Physicians (n = 44)	Advanced Practice Nurses (n = 35)
Sexually Transmitted Disease History	98.6%	90.9%	100.0%
Multiple Sexual Partners	73.4%	70.5%	91.4%
Exchange Money/Drugs for Sex	36.0%	29.5%	57.1%
Sexual Contact with HIV-Positive Person	62.6%	56.8%	71.4%
Sexual Contact with Bisexual Male	35.3%	27.3%	62.9%
Sexual Contact with Injecting Drug User	50.4%	47.7%	80.0%
Sexual Assault or Rape	54.7%	54.5%	74.3%
Drug Use History	94.2%	90.9%	100.0%
Residence in Areas With High HIV Rates	22.3%	18.2%	22.9%
None of the Above	0.7%	4.5%	0.0%

*Respondents were instructed to indicate all risk behaviors that are routinely evaluated.

Table 5. Percentage of Survey Participants Who Indicated That Selected Factors Impaired or Precluded Implementation of a Comprehensive HIV Education/Counseling Program in Their Practice Setting by Type of Provider, Missouri, 1995.

Factor*	OB/GYN Physicians (n = 139)	GP/FP Physicians (n = 44)	Advanced Practice Nurses (n = 35)
Limited Staff Time	56.8%	63.6%	57.1%
Limted Physical Space	14.4%	18.2%	20.0%
No Money for Extra Staff	28.8%	29.5%	31.4%
Patient Population Low Risk/No Need	39.6%	34.1%	11.4%
Low Priority	5.8%	11.4%	5.7%
Lack of Training for Staff	22.3%	34.1%	34.3%
Something Else	7.2%	11.4%	5.7%

*Respondents were instructed to indicate all factors that applied to their practice/work setting.

Most of the remainder of this section describes the specific practices of the respondents with regard to their childbearing-age female patients as well as, more specifically, their pregnant patients. To make the analysis more straightforward, the responses of the ONs are not included. This is due to the fact that, in some circumstances, an ON may provide care for the patients of different primary providers (physicians and/or nurse clinicians), and each of those primary providers may have a different approach with regard to the practices being surveyed here.

Table 4 describes the practices of OB/GYNs, GP/FPs and APNs regarding the medical/social history which is routinely obtained on their patients who are *women of childbearing age*. Over 90 percent of these providers reported that a history of both sexually transmitted diseases and drug use is solicited from these patients on a routine basis. Other risk behaviors, however, are less consistently evaluated.

Providers were questioned about provision of HIV/AIDS education to their childbearing-age female patients. In response, 25.9 percent of OB/GYNs, 11.4 percent of GP/FPs and 54.3 percent of APNs indicated that such education is provided to all patients who are women of childbearing age. In contrast, 22.3 percent of OB/GYNs, 34.1 percent of GP/FPs and 11.4 percent of APNs indicated that HIV/AIDS education is never provided to these patients.

Providers were additionally asked about provision of HIV counseling before a patient is tested for HIV infection. Ninety-two percent of OB/GYNs, 95.3 percent of GP/FPs and 91.4 percent of APNs indicated that such pre-test counseling is routinely performed before HIV testing is undertaken.

The providers were asked to indicate which factors impaired or precluded the implementation of a comprehensive HIV education and testing program in their practice settings. Their responses are shown in Table 5. For each of the provider groups, the most frequently indicated factor impairing their ability to provide such a program was limited staff time (56.8% of OB/GYNs, 63.6%

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Table 6. Categories of Pregnant Women Receiving Prenatal Care Who Are Routinely Offered HIV Testing by Type of Provider, Missouri, 1995.

Category of Pregnant Women*	OB/GYN Physicians (n = 139)	GP/FP Physicians (n = 44)	Advanced Practice Nurses (n = 35)
Those believed to be at increased HIV risk based on medical/social history	34.5%	43.2%	31.4%
Those believed to be at increased HIV risk based on physical exam/lab findings	16.5%	29.5%	25.7%
All pregnant women who present for care	67.6%	54.5%	68.6%
Other criteria	2.2%	4.5%	5.7%
HIV testing not routinely offered to any prenatal patients	6.5%	2.3%	14.3%

*Respondents were instructed to indicate all categories of pregnant patients who were routinely offered HIV testing.

Table 7. Responses of Survey Participants to the Question of Whether an HIV-Infected Pregnant Woman Would Continue to Receive Prenatal Care in Their Practice Setting by Type of Provider, Missouri, 1995.

Response	OB/GYN Physicians (n = 139)	GP/FP Physicians (n = 44)	Advanced Practice Nurses (n = 35)
Continue to receive prenatal care (possibly in consultation with other professionals)	38.1%	25.0%	34.3%
Be referred to a provider in another practice setting to receive her prenatal care	25.2%	27.3%	34.3%
The decision on whether to continue to provide prenatal care (vs. referral to a provider in another practice setting) would be based on the women's stage of illness and/or other factors	35.3%	40.9%	25.7%
No response	1.4%	6.8%	5.7%

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of GP/FPs and 57.1% of APNs). For OB/GYNs, the second most frequently indicated factor was the perceived low risk of their patient population (this response was indicated by 39.6 percent of OB/GYNs). For GP/FPs, two factors tied for second: the perceived low risk of their patients and the lack of training for staff (each of these responses was indicated by 34.1 percent of GP/FPs). Among APNs, the second most frequently mentioned factor interfering with implementation of a comprehensive HIV prevention program was lack of training for staff (this response was indicated by 34.3 percent of APNs).

Questions were asked about the specific practices of these providers with regard to their *pregnant patients*. Table 6 indicates those categories of pregnant women who are routinely offered HIV testing. Over two-thirds (67.6%) of OB/GYNs, 54.5 percent of GP/FPs and 68.6 percent of APNs reported that testing is offered to all pregnant women presenting for care, regardless of perceived HIV risk.

Providers were asked what percentage of their pregnant patients *who are offered HIV testing* agree to be tested. Relatively high percentages of respondents (55.2% of OB/GYNs, 66.7% of GP/FPs and 51.4% of APNs) reported that, in their experience, over 75 percent of pregnant patients who are offered testing for HIV consent to be tested. This included 27.2 percent of all OB/GYNs, 43.6 percent of all GP/FPs, and 11.4 percent of all APNs who indicated that 100 percent of their pregnant patients who are offered HIV testing agree to such testing.

Providers were asked whether a pregnant patient who is found to be infected with HIV would continue to receive prenatal care in their practice setting. Their responses are shown in Table 7. Those providers who indicated that an HIV-infected pregnant woman would,

at least in some circumstances, continue to receive prenatal care in their practice setting (73.4% of OB/GYNs, 65.9% of GP/FPs and 60.0% of APNs) were then asked whether she would generally be offered ZDV to reduce the risk of perinatal HIV transmission. A high proportion of respondents (92.2% of OB/GYNs, 89.7% of GP/FPs and 76.2% of APNs) indicated that ZDV would generally be offered in this situation.

Discussion

Current recommendations from USPHS[3], and from professional groups such as the American Academy of Pediatrics (AAP)[4] and the American Medical Association (AMA)[5], state that all pregnant women should receive HIV education and counseling, and then be encouraged to undergo voluntary HIV testing. Additional guidelines have been issued by USPHS on the use of zidovudine to reduce the risk of perinatal HIV transmission.[2] A recent policy statement from the Missouri Department of Health is in agreement with these recommendations[6], and the Missouri Perinatal Association has also expressed its support.[7] It is encouraging that a high proportion of respondents to the present survey agreed on the need for HIV risk assessment, education and counseling, as well as on the importance of HIV testing for pregnant women. A high proportion of respondents also agreed that ZDV can significantly reduce the risk of perinatal transmission of HIV.

There was much less agreement among survey respondents on whether there should be mandatory HIV testing of pregnant women, and mandatory ZDV treatment of those pregnant women who are HIV-infected. This is reflective of the ongoing societal debate on these issues. With regard to HIV testing, the Centers for Disease Control and Prevention (CDC) has stated that high levels of test acceptance can be achieved among women without mandating testing.[3] Evidence for this is seen in the present survey where, for example, 43.6 percent of the GP/FPs reported that when HIV testing is offered to their pregnant patients, 100 percent of these women agree to be tested.

The fact that only 24.6 percent of survey questionnaires were returned requires that extreme caution be exercised in attempting to generalize the results to all prenatal providers in the state. However, certain findings from the survey suggest opportunities for improvement in the knowledge and practices of providers with regard to HIV prevention:

- Some prenatal providers apparently remain unaware of the ACTG 076 study[1] and the subsequent USPHS recommendations on ZDV use.[2]
- While most respondents appear to routinely evaluate their patients for a history of sexually transmitted diseases and drug use, a small percentage do not. In addition, a sizable proportion of providers do not routinely evaluate their patients for HIV risk behaviors such as having multiple sexual partners, exchange of sex for money or drugs, and sexual contact with an injecting drug user.
- HIV/AIDS education is not uniformly provided to all female patients of childbearing age. Also, it appears that in some instances HIV counseling is not conducted before HIV testing is performed.[§]
- Although a relatively high proportion of respondents (including approximately two-thirds of OB/GYNs and APNs) routinely offer HIV testing to all their pregnant patients, there remain many providers who do not routinely offer such testing, despite the fact that it has been recommended by USPHS[3], AAP[4] and AMA.[5]
- Among respondents who stated they would provide prenatal care, at least in certain circumstances, to HIV-infected pregnant women, about 10 percent of the physicians, but almost 25 percent of the APNs, indicated these women would not generally be offered ZDV to reduce the risk of perinatal transmission.

The challenge for public health officials, and for other persons and organizations concerned with the health of mothers and infants, is to find practical ways to assist prenatal providers (and medical providers generally) to maximize their HIV prevention efforts. The preceding section suggests specific problem areas towards which such assistance should be directed. In addition, the survey respondents identified certain general issues which, in many practice settings, will need to be addressed before an optimal HIV prevention effort can be instituted. These issues include limited staff time and physical space, lack of training for staff, and the perception that the patient population to which care is provided is at low risk for HIV infection. The response to these issues must include:

- Helping providers develop methods to provide effective HIV risk assessment, education and counseling to their patients in a time- and resource-efficient manner.
- Providing convenient opportunities for education and training of physicians, nurses and other medical staff.
- Helping providers understand that any practice setting can include patients at risk for HIV infection, and that this risk may not be recognized by either the provider or the patient.

REFERENCES:

1. Connor EM, Sperling RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine

(continued on page 21)

[§] Missouri law (191.653, RSMo) states that physicians, hospitals or other persons authorized by the Department of Health who perform or conduct HIV blood sampling shall provide consultation with the subject prior to taking the sample and during the reporting of the test results. (The Missouri General Assembly recently passed legislation which changes the wording of 191.653, RSMo from "HIV blood sampling" to "HIV sampling". Consequently, the consultation specified by this statute must now take place whenever any specimen [i.e., blood, oral fluids, etc.] is obtained for the purpose of determining the presence of HIV infection.) The accompanying Department of Health rule (19 CSR 20-26.040) states that, where testing is done by a physician or a physician's delegated representative, the scope of the consultation shall be governed by the physician's professional judgment based on the clinical situation, including the purpose of and need for HIV testing, and shall be at least as comprehensive as the type of consultation provided for other diagnostic tests or procedures.

Heat Surveillance Summary - 1995

Diane C. Rackers
Office of Epidemiology

The Missouri Department of Health, in cooperation with local health departments, has conducted some form of heat surveillance since the great heat wave of 1980 when 295 Missourians died due to heat-related causes. Through public health education and news releases alerting Missourians to the possibility of heat-related illness, risk factors and prevention recommendations, the department works to increase the public consciousness regarding this environmental stress. Heat indices from five areas of Missouri are monitored on a daily basis during the summer months and appropriate heat crisis procedures implemented as appropriate.

The summer of 1995 started with gradually warming temperatures typical of summers in Missouri, but turned into one of the hottest summers experienced in the past several years. On July 10 a forecast of increased temperatures prompted the Department of Health to issued its annual news release urging awareness of heat-related illness. By July 11, temperatures in four areas of the state had increased dramatically and heat indices had risen from 92–96 to 105–112. The weather forecast called for even hotter temperatures, so the Department of Health issued the first statewide heat alert on July 12 indicating that "Missourians need to be aware that the high heat and humidity we are experiencing can be very dangerous, especially for older Missourians." In addition, Missourians were urged to use the state's toll-free adult abuse hotline to report any elderly persons suffering from the heat and needing assistance. Certain senior centers across the state were designated as cooling sites and operating hours were extended to help meet the demand. Heat indices peaked on July 13 with 121 in St. Louis, 112 in Kansas City, 116 in Columbia, 108 in Springfield and 106 in Cape Girardeau. On July 16, heat indices dropped below 105 in four areas of the state and the statewide heat alert was lifted on July 17. These six days of high heat indices accounted for 49 percent (403/819) of the reported heat-related illnesses and 61 percent (35/57) of the recorded heat-related deaths in 1995. See Figure 1.

Heat indices across the state reached 103–110 again on July 27. The Department of Health issued a second heat alert on July 28. Heat indices fluctuated around 100 for several days until the heat alert was lifted on August 1. During this heat wave, 42 heat-related illnesses and one heat-related death were reported.

Heat indices again increased to over 100 on August 7 with 101 in St. Louis, 110 in Kansas City, 107 in Columbia, 104 in Springfield and 105 in Cape Girardeau. The Department of Health issued a third heat alert on August 8. Heat indices across the state remained around 105 or more for 14 days until August 22 when the heat alert was lifted. This 14-day heat wave accounted for 33 percent (273/819) of the reported heat-related illnesses and 23 percent (13/57) of the recorded heat-related deaths in 1995. See Figure 1.

It was noted that many more heat-related illnesses and deaths were reported during the 6-day heat wave of July 12–17 than the 14-day heat wave of August 8–22. We attribute this to the extremely high heat indices experienced across the state on July 12 and 13 in addition to the

Stages of Heat Advisories

A **Heat Warning** is issued when a heat index of 105° is first reached (or predicted). The Department of Health urges personal caution as well as concern for others at high risk. In addition, monitoring of temperatures is intensified.

A **Heat Alert** will be announced when:

1. The afternoon heat index has been at least 105° for two days and
2. When weather forecasts call for continued high-stress conditions for at least 48 hours over a large proportion of the state.

During a **Heat Alert**, the Department of Health encourages local health departments to arrange for cooling shelters, and also encourages other community agencies to provide relief from the heat stress.

The Department of Health will recommend to the Governor that a statewide **Heat Emergency** be declared when:

1. Extensive areas of the state are experiencing high and sustained levels of heat stress (determined when the heat index reaches 105° for three days); and
2. Increased levels of heat-related illnesses or deaths are found in these areas; and
3. The National Weather Service predicts that hot and humid conditions are likely to continue for several days.

The **Heat Emergency** designation will be canceled when the heat index falls below 105° for 48 hours and the National Weather Service predicts a low probability that severe conditions will return within 48 to 72 hours.

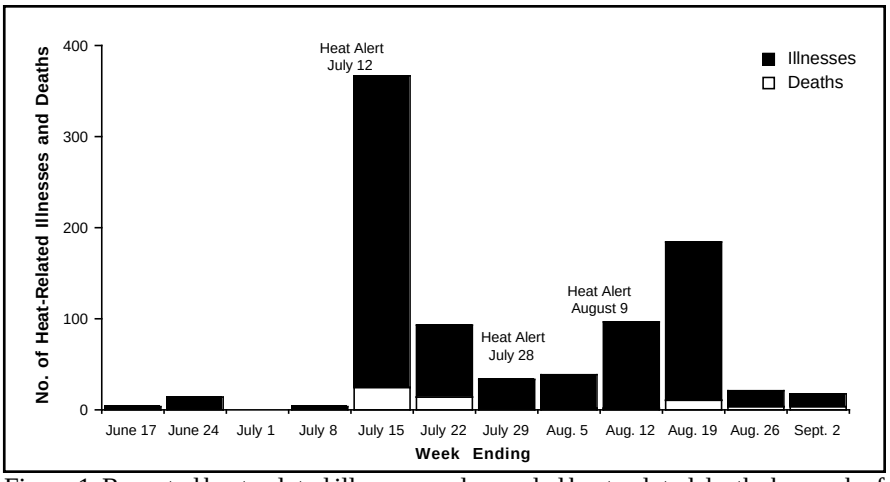


Figure 1. Reported heat-related illnesses and recorded heat-related deaths by week of occurrence, Missouri, Summer 1995.

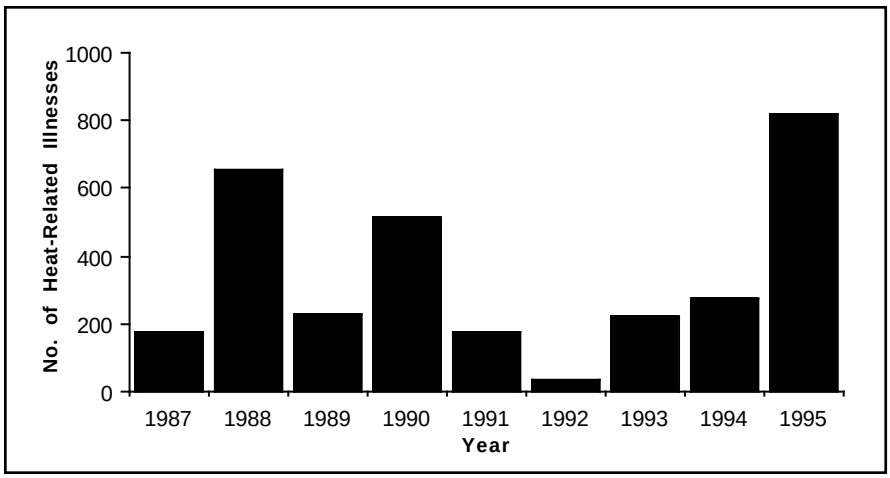


Figure 2. Reported heat-related illnesses by year, Missouri, 1980–95.

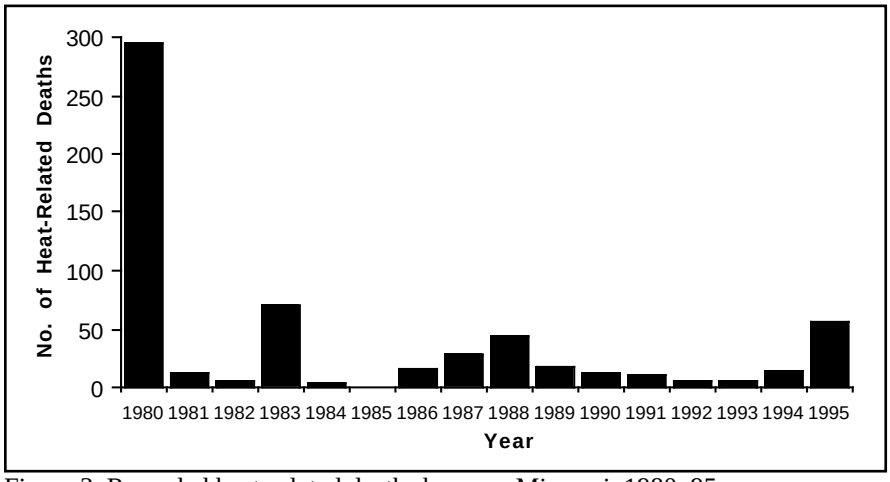


Figure 3. Recorded heat-related deaths by year, Missouri, 1980–95.

fact that the cooler than normal temperatures experienced in June and early July had not allowed Missourians to acclimatize to the heat or to develop appropriate concerns for warnings regarding prevention of heat-related illness.

Temperatures remained quite warm for the remainder of the summer, but heat indices were not simultaeously elevated statewide and no further heat alerts were warranted.

Table 1. Recorded Heat-Related Deaths, Missouri, 1994–95

Age	1994	1995
under 5	0	0
5-14	0	0
15-24	0	0
25-34	0	0
35-44	0	8
45-54	1	3
55-64	2	4
65-74	3	15
75-84	2	17
85+	6	10
Total	**14**	**57**

During the summer of 1995, three statewide heat alerts were issued, whereas only one statewide heat alert was issued in 1994 and one in 1993; no statewide heat alerts were issued in 1992 or 1991. There were 819 heat-related illnesses reported in 1995; the highest number reported since 1987 when the department first started recording heat-related illnesses. See Figure 2.

In 1995, there were 57 heat-related deaths recorded. This is the third highest number of heat-related deaths in the decades of the 1980s and 1990s. There were 295 deaths recorded in the heat wave of 1980 and 71 in 1983. See Figure 3. As in past summers, the majority of heat-related deaths occurred in individuals age 45 and older. See Table 1.

As in past years, the St. Louis area accounted for the majority of reported heat-related illnesses and recorded heat-related deaths in 1995, accounting for 439 (54%) of the heat-related illnesses and 33 (52%) of the heat-related deaths. The St. Louis public health authorities declared three heat warnings during the summer of 1995 on July 13, July 29 and August 8.

Hyperthermia became reportable by law in Missouri effective April 8, 1993. Hyperthermia is defined as a physician-diagnosed case of heat exhaustion or heat stroke. Heat exhaustion means a reaction to excessive heat marked by

(continued on page 21)

Statewide Committee Meets to Discuss Recommendations to Prevent and Control Vancomycin-Resistant Enterococci

Caryl Collier, R.N., M.P.H., C.I.C.
Bureau of Communicable Disease Control

In 1991, the Bureau of Communicable Disease Control convened a statewide multi-disciplinary committee to resolve the discrepancies in infection control management of persons having infection or colonization with methicillin resistant *Staphylococcus aureus* (MRSA). The decision was made to concentrate on management of residents in long term care facilities (LTCFs). By September 1992, the committee, then called the Consensus Committee on Prevention and Control of Multiply Resistant Organisms, agreed on recommendations for preventing person-to-person transmission of all common pathogens, including MRSA, and published the document, *Infection Control in Long Term Care Facilities with an Emphasis on Body Substance Precautions* (see box).

In November 1993, the Consensus Committee was reconvened to address the pervasiveness of antibiotic-resistant organisms, particularly vancomycin resistant enterococcus (VRE). This Committee is now called the Advisory Committee on Infection Prevention and Control and continues to be multi-disciplinary with physicians, nurses, microbiologists, pharmacists, infection control professionals and epidemiologists from urban and rural areas of Missouri. Members represent acute care hospitals, LTCF's, private medical practice, Missouri Hospital Association, Missouri Division of Aging, Missouri Health Care Association, Missouri Board of Pharmacy, Missouri Patient Care Review Foundation, Missouri State Medical Association, Missouri Association of Osteopathic Physicians and Surgeons, Missouri Nurses Association, private laboratories, and the Missouri Department of Health (DOH). Most committee members are also members of the Association for Professionals in Infection Control and Epidemiology (APIC) or the Society for Healthcare Epidemiology of America (SHEA).

During recent meetings on February 6 and May 9, 1996, the Advisory Committee met to discuss and develop for distribution recommendations to prevent and control VRE. Although VRE is only one of many organisms resistant to key antibiotics, it is an organism which, when identified in patients or residents of LTCF's, is causing much anxiety and confusion among health care providers as they attempt to implement the most effective control methods. Because the Advisory Committee is sensitive to the need of the health care community for direction on care of persons with VRE, recommendations will be specific to VRE.

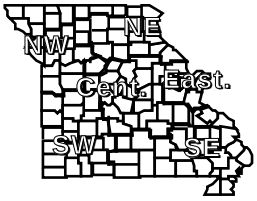
The emergence of antimicrobial resistant organisms is due to multiple factors and necessitates approaching prevention and control efforts from a broad perspective. The Advisory Committee is focusing on the responsibilities of healthcare facilities, healthcare professionals and the public to prevent the emergence and transmission of these organisms. While overuse and misuse of antimicrobials probably contributes significantly to the increased prevalence of multi-resistance, person-to-person and environmental transmission also contribute to the increase.

Consistent with a varied approach to this problem, the committee has recently approved a public education brochure entitled, *What You Should Know About Taking Antibiotics Correctly*. This brochure is written for the lay person at approximately the 9th grade reading level, and is available by calling the DOH Audiovisual and Literature Distribution unit at (573) 751-6048. Camera-ready copies of the brochure, as well as a diskette, containing the document in a Macintosh PageMaker file, are available from DOH for organizations wishing to print their own copies for constituents. In order to obtain the camera-ready copy and diskette, call the Bureau of Communicable Disease Control at (573) 751-6115. The brochure can also be downloaded from the file "antibiotics" pfd on the Internet at the following address: www.health.state.mo.us/cdc/brochure.html. This requires a pdf reader, which is free on the web site.

At the present time, no aggregate database exists in Missouri to assess trends for either the types of resistant organisms or the level of resistance to key antibiotics. Because of this, plans are underway to devise a surveillance method for assessing the number of marker-resistant organisms, including VRE, being isolated by laboratories in Missouri. The committee is advising DOH on priorities and methodology in this surveillance effort.

Recommendations for preventing person-to-person transmission of VRE will be available by July 1. In addition, sample policies and procedures for restricting the use of antimicrobials in long-term care facilities are being developed, and will most likely be published as supplements to the document, *Infection Control in Long Term Care Facilities with an Emphasis on Body Substance Precautions*. The target date for revisions and supplements to this document is December 1996.

Copies of *Infection Control in Long Term Care Facilities with an Emphasis on Body Substance Precautions* are available postpaid, $5.00 for one copy, $7.50 for two or $10.00 for three. A check made payable to the Missouri Department of Health should be sent to Connie Lepper, Bureau of Communicable Disease Control, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6115.



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
November - December, 1995

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1995	1994	FOR 1995	FOR 1994	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	512	185	82	268	146	133		0	0	0	0	1326	1519	8840	10147	10009
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	1	0	1	1		0	0	0	0	3	3	10	7	22
Hib Other Invasive	1	1	0	0	0	1		0	0	1	0	4	6	18	44	57
Influenza	6	48	33	6	16	26		2	6	33	13	189	0	491	163	220
Measles	0	0	1	0	0	0		0	0	0	0	1	1	2	161	1
Mumps	1	1	1	0	0	0		0	0	0	0	3	6	25	44	44
Pertussis	0	1	1	2	1	1		0	0	0	0	6	6	63	45	116
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	2	2
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	3	1	1
Viral Hepatitis																
A	61	7	29	3	38	1		28	18	10	1	196	96	1338	619	653
B	5	1	6	1	7	3		5	29	9	4	70	120	437	538	549
Non A - Non B	0	0	0	1	3	1		0	0	0	0	5	13	23	32	31
Unspecified	0	0	0	0	0	0		0	0	0	0	0	1	1	1	15
Meningitis																
Aseptic	6	1	2	0	4	2		0	1	3	2	21	26	269	175	272
Meningococcal	0	0	1	1	5	3		0	0	4	0	14	3	54	43	34
Enteric Infections																
Campylobacter	1	2	12	7	11	7		4	3	19	3	69	81	601	631	614
Salmonella	6	5	21	10	14	12		7	3	20	9	107	106	577	642	617
Shigella	127	5	16	30	14	23		6	7	17	1	246	253	1138	654	654
Typhoid Fever	0	0	0	0	0	0		0	0	1	0	1	0	3	1	2
Parasitic Infections																
Amebiasis	0	1	2	0	0	0		0	2	0	0	5	8	18	38	26
Giardiasis	20	16	32	13	21	14		12	15	25	9	177	165	761	774	774
Sexually Transmitted Dis.																
AIDS	10	2	9	4	7	8	7	36	28	13	7	131	97	769	727	662
Gonorrhea	70	18	92	63	48	14		529	703	321		1858	2230	11302	12555	14811
Genital Herpes	33	14	58	34	49	22		66	67	198		541	552	3502	3480	3480
Nongonoc. urethritis	14	5	15	17	10	23		242	559	562	9	1456	963	8511	6062	6855
Prim. & Sec. syphilis	1	0	2	3	0	1		4	35	15		61	150	584	987	987
Tuberculosis																
Extrapulmonary	0	0	1	0	0	0	0	2	1	2	1	7	9	43	44	44
Pulmonary	6	0	1	10	7	0	1	7	10	3	3	48	44	201	216	211
Zoonotic																
Animal Bites	140	40	59	109	103	59		0	0	337	20	867	890	6851	6831	6514
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	0	4	1
Rabies (Animal)	0	0	0	1	0	0		0	0	0	0	1	7	30	27	30
Rocky Mtn. Sp. Fever	0	0	2	1	2	0		0	0	0	0	5	6	30	22	24
Tularemia	0	0	0	0	0	0		0	0	0	0	0	2	25	24	33

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 4
Encephalitis (infectious)
Encephalitis (viral/arbo-viral) - 1
Granuloma Inguinale
Kawasaki Disease - 7
Legionellosis - 5
Leptospirosis
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 3
Trichinosis

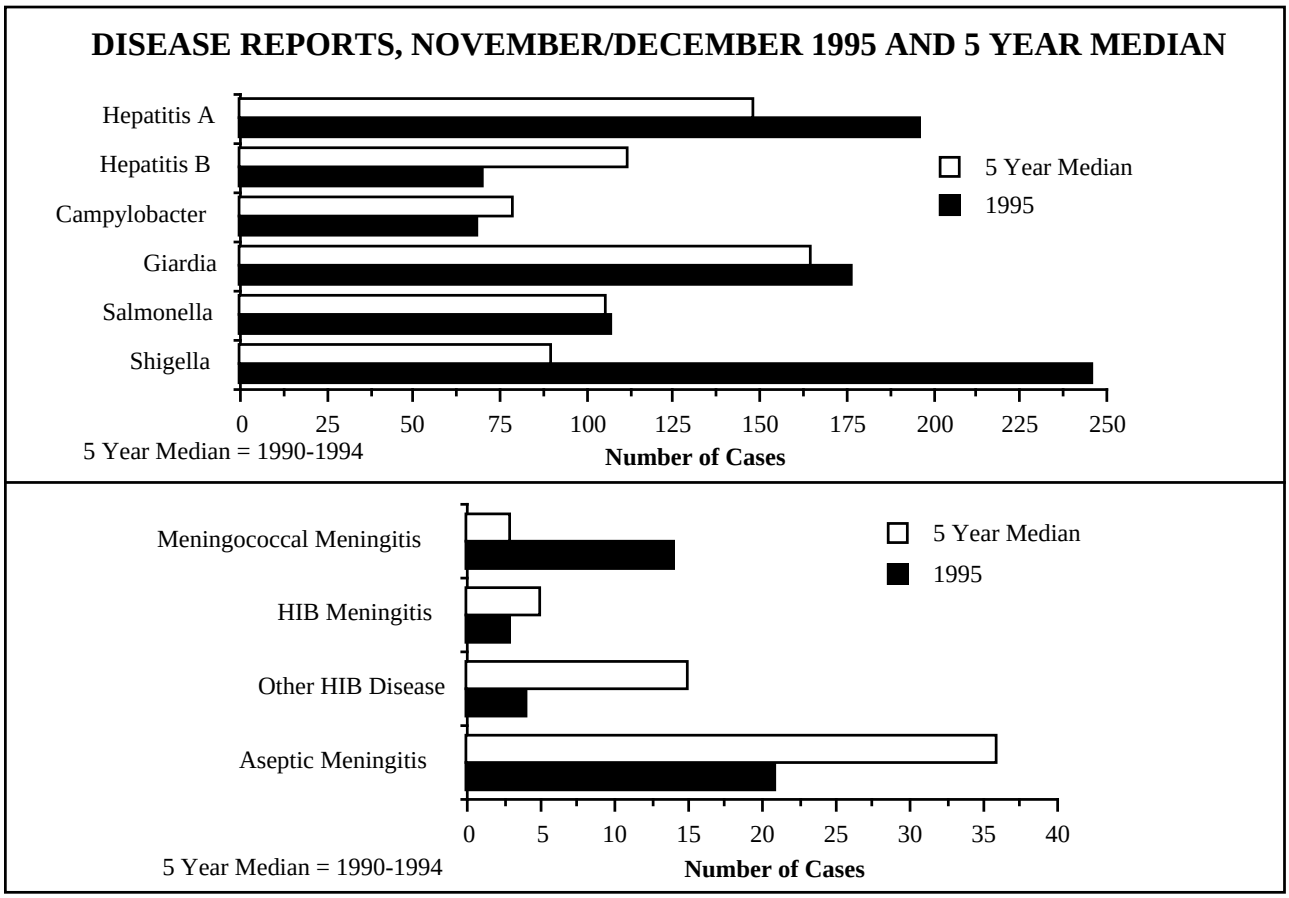
Outbreaks

Foodborne - 3
Waterborne
Nosocomial - 2
Pediculosis
Scabies - 2
Other
AGI - 1
Pneumonia - 1

*Reporting Period Beginning October 29, Ending December 30, 1995.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE



VIRAL HEPATITIS

The November/December 1995 bimonthly period showed an increase of 104.2%, from 96 cases of Hepatitis A during November/December 1994 to 196 cases during November/December 1995. Hepatitis A rose 32.4% from the five year bimonthly median of 148 cases. Hepatitis B cases fell by 41.6% for the bimonthly period, from 120 in 1994 to 70 in 1995. This trend continues in 1996 and may be associated with a reduction in certain sexually transmitted diseases. Hepatitis B is 37.5% below the five year bimonthly median for November/December of 112 cases.

ENTERICS

Campylobacter decreased by 14.8% during the bimonthly time period, from 81 cases in 1994 to 69 cases in 1995. It fell 12.7% from the five year median of 79 cases. There was little change in Salmonella, from 106 in 1994 to 107 cases in 1995. The five year median is 106 cases. Shigellosis decreased by 2.8% from 253 cases in 1994 to 246 cases in 1995. It was 173.3% above the five year median of 90 cases.

PARASITES

Giardiasis increased by 7.3% from 165 cases during the 1994 bimonthly period to 177 in 1995. The five year median is 165 cases.

MENINGITIS

Aseptic meningitis decreased by 19.2% from 26 cases in 1994 to 21 cases in the 1995 bimonthly time period. It fell by 41.6% from the five year median of 36 cases. This change may reflect a decrease in investigational follow-up rather than a drop in aseptic meningitis frequency. Meningococcal meningitis rose by 366.6% from 3 cases in 1994 to 14 cases in 1995. The five year median is 3 cases.

HIB DISEASE

Three cases of Hib meningitis were reported for the period in 1995 and in 1994. It is a decrease of 20.0% from the five year median of 5 cases. Other invasive Hib disease fell from 6 cases in 1994 to 4 cases in 1995,a drop of 33.3%. Other invasive Hib disease was made reportable in 1990 and there is now a November/December bimonthly five year median for other invasive Hib disease. Other invasive Hib disease fell by 73.3% from the bimonthly five year median of 15 cases.

HIV Infection in Childbearing Women in Missouri: Results of the Survey of Childbearing Women 1991–94

Robert H. Hamm, M.D., M.P.H.
Office of Epidemiology

Detailed information on the HIV infection status of Missouri women who give birth has been available since 1991 from the Survey of Childbearing Women (SCBW). The SCBW, until its suspension in May 1995, was conducted in 44 states, the District of Columbia, Puerto Rico and the U.S. Virgin Islands in collaboration with the Centers for Disease Control and Prevention (CDC), the National Institute of Child Health and Human Development and state and territorial health departments. It was based on the systematic, unlinked testing for HIV antibody of residual blood specimens routinely collected on filter paper from newborn infants for metabolic screening.

A positive test indicates HIV infection in the mother, but not necessarily in the infant (who may or may not be infected). This follows from the fact that if the mother is HIV-infected, her HIV antibodies will be transferred across the placenta to her infant, and thus when the infant's blood is tested, what will actually be detected are maternal antibodies.

Table 1. Results of the Survey of Childbearing Women by Race/Ethnicity, Mother's Age Group and Mother's Area of Residence, Missouri, 1994

	Total Tests Performed		Tests Positive for HIV Antibody		HIV Seroprevalence	
	No.	%	No.	%		
Race/Ethnicity						
White	51,130	72.5%	9	24.3%	0.018%	(2 per 10,000)
Black	11,281	16.0%	25	67.6%	0.222%	(22 per 10,000)
Hispanic	705	1.0%	0	0.0%	0.000%	(0 per 10,000)
Asian	482	0.7%	0	0.0%	0.000%	(0 per 10,000)
Native American	50	0.1%	0	0.0%	0.000%	(0 per 10,000)
Other	1,118	1.6%	2	5.4%	0.179%	(18 per 10,000)
Unknown	5,750	8.2%	1	2.7%	0.017%	(2 per 10,000)
Mother's Age Group						
<15	209	0.3%	0	0.0%	0.000%	(0 per 10,000)
15–19	9,239	13.1%	5	13.5%	0.054%	(5 per 10,000)
20–24	16,957	24.0%	14	37.8%	0.083%	(8 per 10,000)
25–29	16,034	22.7%	6	16.2%	0.037%	(4 per 10,000)
30–34	12,132	17.2%	2	5.4%	0.016%	(2 per 10,000)
35–39	4,381	6.2%	1	2.7%	0.023%	(2 per 10,000)
>39	744	1.1%	0	0.0%	0.000%	(0 per 10,000)
Unknown	10,820	15.3%	9	24.3%	0.083%	(8 per 10,000)
Mother's Area of Residence						
St. Louis Area*	22,882	32.4%	25	67.6%	0.109%	(11 per 10,000)
Kansas City Area**	12,034	17.1%	3	8.1%	0.025%	(2 per 10,000)
Outstate Missouri	31,345	44.5%	8	21.6%	0.026%	(3 per 10,000)
Unknown	4,255	6.0%	1	2.7%	0.024%	(2 per 10,000)
TOTAL	**70,516**	**100.0%**	**37**	**100.0%**	**0.052%**	**(5 per 10,000)**

*St. Louis City, St. Louis County and St. Charles County
**Cass, Clay, Jackson, Lafayette, Platte and Ray counties

Results of the SCBW in Missouri in 1994

During 1994, women who were residents of Missouri delivered 73,279 live-born infants. Blood specimens from 70,516 (96.2%) of these infants were tested for the presence of HIV antibody; 37 (0.052%) specimens were positive, reflecting the presence of HIV infection in the mother. This indicates an HIV seroprevalence rate in Missouri childbearing women in 1994 of 0.052 percent, or approximately 5 per 10,000 childbearing women.[†]

A summary of the results from the SCBW for 1994 is shown in Table 1, which examines the data by race/ethnicity, mother's age group and mother's area of residence.

Race/Ethnicity

Of the 70,516 specimens tested during 1994, 51,130 (72.5%) were from white infants. Of the 37 specimens which were positive for HIV antibodies, nine (24.3%) were from white infants. This indicates an HIV seroprevalence rate among white

(continued on page 16)

[†] In using SCBW data to determine numbers and rates of HIV-infected childbearing women, the assumption is made that each woman whose infection is indicated by a positive specimen from her infant gave birth to only one infant during the course of the year. This seems a reasonable assumption because:

a) pregnancies resulting in multiple live births are relatively uncommon, and the Missouri Department of Health has received no reports of multiple-birth pregnancies occurring in HIV-infected women through the end of 1994, and no reports of perinatal HIV infections occurring in children born of multiple-birth pregnancies

b) while a woman could, within a 12-month period of time, give birth and then subsequently become pregnant and deliver a second infant, this would appear to be an uncommon occurrence.

Table 2. Survey of Childbearing Women: Total HIV Antibody Tests Performed, Number of Positive Tests and Percent Positive by Race/Ethnicity and Mother's Area of Residence, Missouri, 1994.

Mother's Area of Residence	White			Black			Other/Unknown		
	Tests Performed	Positive Tests	Percent Positive	Tests Performed	Positive Tests	Percent Positive	Tests Performed	Positive Tests	Percent Positive
St. Louis Area*	11,305	3	0.027%	6,926	21	0.303%	4,651	1	0.022%
Kansas City Area**	8,567	2	0.023%	2,397	1	0.042%	1,070	0	0.000%
Outstate Missouri	28,169	4	0.014%	1,234	3	0.243%	1,942	1	0.051%
Unknown	3,089	0	0.000%	724	0	0.000%	442	1	0.226%
TOTAL	**51,130**	**9**	**0.018%**	**11,281**	**25**	**0.222%**	**8,105**	**3**	**0.037%**

*St. Louis City, St. Louis County and St. Charles County
**Cass, Clay, Jackson, Lafayette, Platte and Ray counties

(continued from page 15)
childbearing women of 0.018 percent, or about two per 10,000.††

In contrast, only 11,281 (16.0%) of the 70,516 total specimens were from black infants, whereas these infants accounted for 25 (67.6%) of the 37 positive specimens. This indicates an HIV seroprevalence rate among black childbearing women of 0.222 percent, or about 22 per 10,000, which is approximately 12 times the rate seen in white childbearing women.

No HIV antibodies were detected in specimens identified as being from Hispanic, Asian or Native American infants. However, for three (8.1%) of the 37 specimens which were HIV antibody-positive, the infant's race/ethnicity was either not known or listed as "other."

Age Group

None (0%) of the 209 specimens from infants whose mothers were less than 15 years of age tested positive for HIV antibody. Five of the 9,239 specimens from infants whose mothers were 15–19 years of age were positive, indicating a seroprevalence rate for these teenage mothers of 0.054 percent. Fourteen of the 16,957 specimens from infants whose mothers were 20–24 years of age were positive, for a seropositivity rate of 0.083 percent. This was the highest seropositivity rate seen in any of the maternal age groups (the second highest, 0.054 percent, was in the 15–19 year olds). No HIV antibodies were detected in specimens from infants of mothers over 40 years of age, although the total number of specimens tested, 744, was relatively small. For nine (24.3%) of the 37 positive specimens, the age group of the mother was unknown.

Area of Residence

Twenty-five (67.6%) of the 37 positive specimens were from infants whose mothers were residents of the St. Louis area (St. Louis City, St. Louis County and St. Charles County). The seroprevalence rate for this region was 0.109 percent, the highest for any region in the state. Although 67.6 percent of the positive specimens came from this region, only 32.4 percent of all specimens tested came from infants whose mothers resided here. Within the St. Louis area, St. Louis City alone contributed 17 of the 25 positive specimens, and these 17 positives represented 45.9 percent of the statewide total.

Three (8.1%) of the 37 positive specimens were from infants whose mothers were residents of the Kansas City area (Cass, Clay, Jackson, Lafayette, Platte and Ray counties). The seroprevalence rate for this region was 0.025 percent.

Eight (21.6%) of the 37 positive specimens were from infants whose mothers were residents of Outstate Missouri. The seroprevalence rate for this region was 0.026 percent, essentially the same as for the Kansas City area.

Race/Ethnicity and Mother's Area of Residence

Table 2 describes 1994 SCBW results by race/ethnicity and mother's area of residence. The seroprevalence rate among white childbearing women was similar in the St. Louis and Kansas City areas, 0.027 percent and 0.023 percent, respectively. In contrast, the seroprevalence rate among black childbearing women was much higher in the St. Louis area (0.303%) compared to the Kansas City area (0.042%). The black seroprevalence rate in Outstate Missouri was relatively high (0.243%), but this was based on a total of three positive tests.

Race/Ethnicity, Mother's Age Group and Mother's Area of Residence

Four (80%) of the five HIV-infected teenage mothers were from the St. Louis area; the race/ethnicity of all four was black. The remaining infected teenager, whose race/ethnicity was listed as "other," was from Outstate Missouri.

Four (44.4%) of the nine infected white childbearing women, and 14 (56.0%) of the 25 infected black childbearing women, were less than 25 years of age. Among both white and black women, the 20–24 year age group contained the largest number of infected individuals.

††In this analysis, the assumption is made that the mother's race/ethnicity is the same as the infant's.

Trends in HIV Infection in Childbearing Women in Missouri: 1991–94

Table 3 and Figure 1 illustrate the trends in HIV seroprevalence in childbearing women in Missouri from 1991 through 1994. The average seroprevalence rate for this period was 0.053 percent, and ranged from 0.045 percent to 0.059 percent. Among white women, the average seroprevalence rate was 0.018 percent, and ranged from 0.012 percent to 0.022 percent. For black women, the average seroprevalence rate was 0.209 percent, and ranged from 0.125 percent to 0.270 percent.

During this four-year period, specimens from two (0.106%) of 1,887 Asian/Pacific Islander infants were positive for HIV antibodies. No positive specimens were identified during these years from Hispanic or American Indian/Alaskan Native infants. Fourteen (0.041%) positive tests were reported from 33,864 infants whose race/ethnicity was unknown or listed as "other."

The total number of positive tests decreased from 1993 to 1994, from 43 to 37. However, the total number of tests performed decreased as well, reflecting a decreased number of births in 1994 compared to 1993, and the 1994 seroprevalence rate of 0.052 percent was only slightly lower than the 1993 rate of 0.059 percent.

Comparison of HIV Seroprevalence Rates in Missouri Childbearing Women with Rates in Childbearing Women Nationwide and in Surrounding States

The HIV seroprevalence rate among Missouri childbearing women has been noticeably lower than the corresponding rate for the United States. For 1992, the last year for which nationwide data are available, the seroprevalence rate for Missouri was 0.05 percent, compared to the United States rate of 0.17 percent. SCBW seroprevalence data from 1993 are available for the states surrounding Missouri. The 1993 rates for these states are shown in Table 4.

Table 3. Survey of Childbearing Women: Total HIV Antibody Tests Performed, Number of Positive Tests and Percent Positive by Race and Year of Child's Birth, Missouri, 1991–94.

	1991	1992	1993	1994	Totals
Totals*					
Tested	75,661	73,774	73,007	70,516	292,958
No. Positive	42	33	43	37	155
Percent Positive	0.056%	0.045%	0.059%	0.052%	0.053%
Whites					
Tested	50,770	51,624	51,761	51,130	205,285
No. Positive	11	10	6	9	36
Percent Positive	0.022%	0.019%	0.012%	0.018%	0.018%
Blacks					
Tested	12,753	12,758	12,586	11,281	49,378
No. Positive	28	16	34	25	103
Percent Positive	0.220%	0.125%	0.270%	0.222%	0.209%

*Totals include 2,381 Hispanics (0 positive), 163 American Indian/Alaskan natives (0 positive), 1,887 Asian/Pacific Islanders (2 positive) and 33,864 individuals for whom race/ethnicity is listed as other/unknown (14 positive).

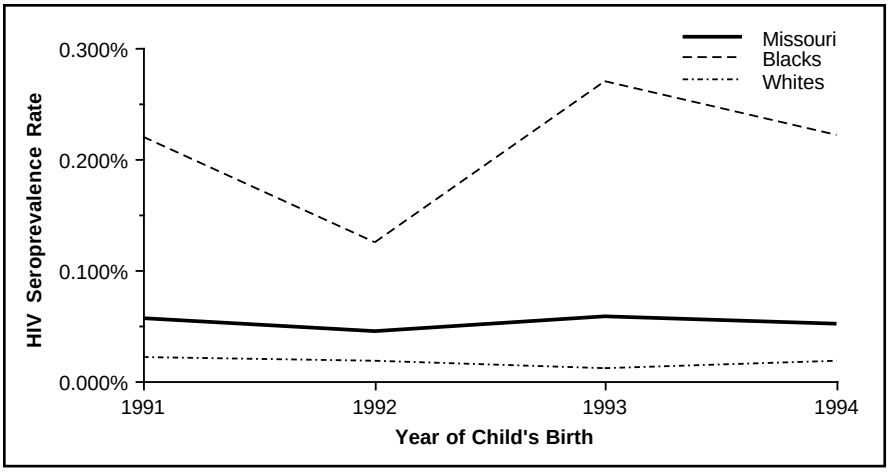


Figure 1. HIV Seroprevalence Rates in Childbearing Women by Race and Year of Child's Birth, Missouri, 1991–94.

Summary

Thirty-seven Missouri women who gave birth during 1994 were infected with HIV. The seroprevalence rate among childbearing women in the state in 1994 was 0.052 percent, or 5 per 10,000 childbearing women. Among HIV-infected childbearing women, certain groups are overrepresented: a) younger women—51 percent of all infected mothers were less than 25 years of age; b) black women—68 percent of all infected mothers were black; and c) residents of the St. Louis area—68 percent of all infected mothers were from this region, the majority from St. Louis City

(continued on page 20)

Table 4. HIV Seroprevalence Rates in Childbearing Women in Missouri and Six Surrounding States*, 1993.

State	HIV Seroprevalence Rate in Childbearing Women
Missouri	0.06%
Illinois	0.09%
Kentucky	0.04%
Tennessee	0.14%
Arkansas	0.07%
Oklahoma	0.05%
Kansas	0.02%
Iowa	0.02%

*No data was available from Nebraska.

Missouri Establishes Directly Observed Therapy (DOT) for Tuberculosis as the Standard of Care

Dan Ruggiero
Bureau of Tuberculosis Control

Tuberculosis (TB) remains a potential problem in Missouri, with a pool of approximately 250,000 infected individuals of whom approximately 250 develop active disease each year. The number of new active cases has fluctuated between 254 in 1991 to 260 in 1994. Data for 1995, shows that Missouri experienced a decline for the first time in over three years, with 244 new cases reported. The relatively stable number of TB cases in Missouri requires that a more proactive approach be taken if we are to achieve our stated goal of 175 cases by the year 2000.

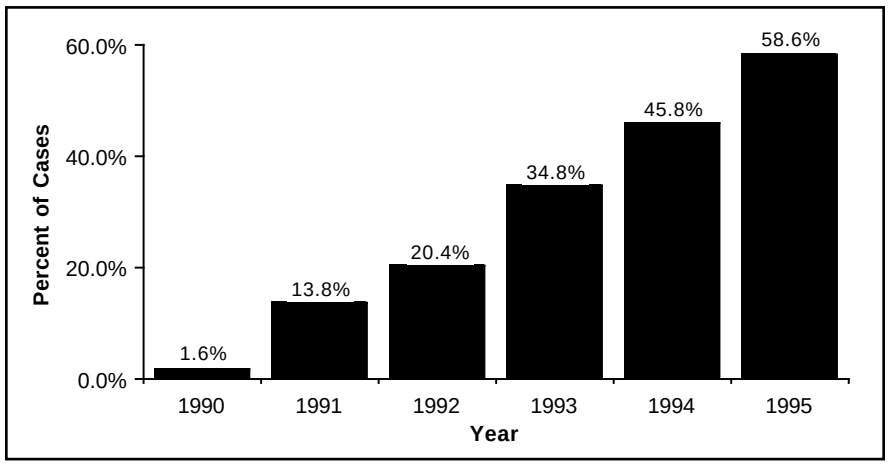


Figure 1. Percent of TB cases on DOT by year, Missouri, 1990–95.

The Missouri Department of Health, Bureau of Tuberculosis Control and the Missouri Advisory Committee on the Elimination of Tuberculosis (MACET) have established directly observed therapy (DOT) as the standard of care for all persons being treated for TB disease in Missouri. DOT consists of a trained person observing and documenting the actual ingestion of each dose of prescribed medication. Such observation requires that the observer assure that the medication has actually been swallowed by the patient. DOT is the only proven method that will ensure that TB patients with active disease will complete the full course of treatment in the shortest time possible. Its effectiveness in ensuring completion of therapy has been repeatedly demonstrated in many controlled research studies and has been well documented in numerous scientific journals. Based on this evidence, DOT has been highly recommended by the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC) and the American Thoracic Society (ATS) of the American Lung Association (ALA).

The concept of DOT is not new. More than three decades ago (in the early 1960's) the work of Drs. Fox in Madras, India, and Moodie in Hong Kong, concluded that effective treatment of TB requires direct supervision of patients' therapy.

In the United States, DOT was advocated in 1966 by Dr. Moulding of National Jewish Hospital in Denver, Colorado, when he pioneered a program of twice weekly TB regimen in selected TB patients. In the late 1970's, Dr. John Sbarraro, from Denver, advocated universal application of DOT.

When Baltimore, Maryland was experiencing high case rates in the late 1970's, DOT was initiated and expanded in subsequent years with marked success. In Mississippi, DOT began in the early 1980's in one region of the state and by the end of the decade, DOT was extended throughout the entire state. By the early 1990's, 98 percent of all TB patients in Mississippi were treated by DOT.

In 1993, the national Advisory Council for the Elimination of Tuberculosis (ACET) established DOT as the standard of care for the treatment of TB. The council recommended that DOT should be considered for all patients because of the difficulty in predicting which patients will adhere to a prescribed regimen. The CDC began to provide increased federal funding of TB control activities and the council recommendation began to take hold in many large urban centers and states, including Missouri.[1]

DOT is carried out by a trained health worker or a responsible third party person (other than a family member) directly observing the patient taking medications as prescribed by the physician. In order to ensure success, local health department staff, the observer, the treating physician and the patient must work together to determine the best approach to implement DOT. This should consist of:

- Mutually selecting a responsible third party person to act as the observer in supervising the ingestion of medication.
- Agreeing on a meeting place for DOT to take place (a clinic, doctor's office, worksite, school, home, shelter or other location).
- Determining the frequency of DOT (daily or two or three times weekly).
- Identifying incentives for the patient to ensure compliance.

When necessary, Self Administered Therapy (SAT) should be the exception

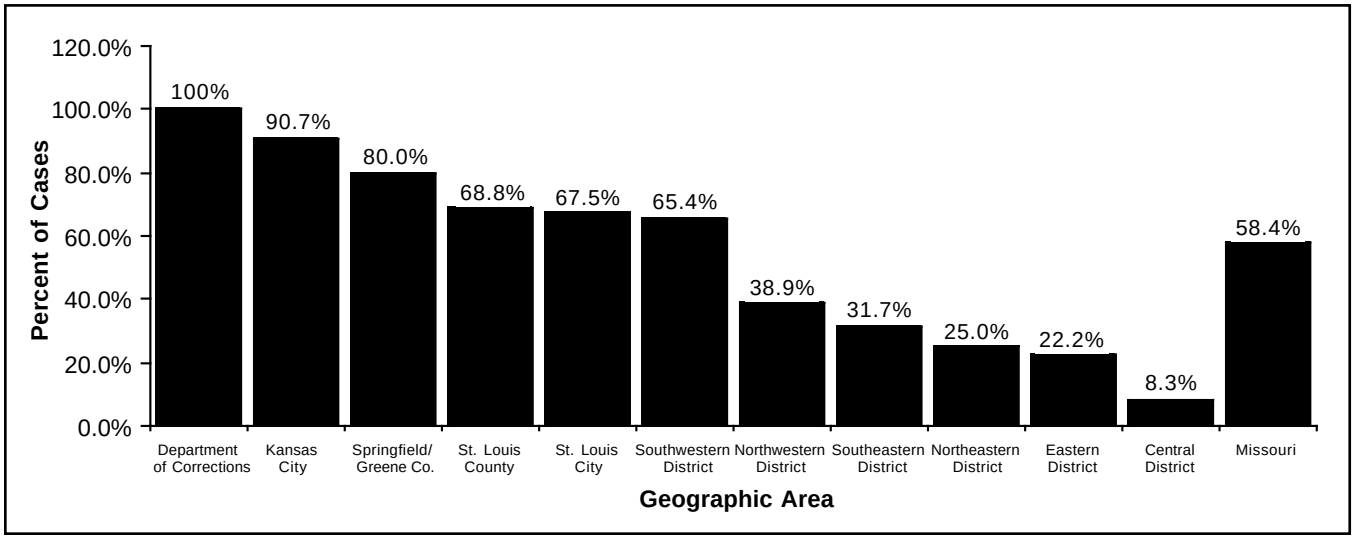


Figure 2. Percent of TB cases placed on DOT by geographic area and Department of Corrections (DOC), Missouri, 1995.

and may be used under very close supervision and direction of the physician and the healthcare team. These includes education, monthly monitoring of side effects and compliance with medication.[2]

In the past two years, the Bureau of Tuberculosis Control has taken several important steps to reduce TB in Missouri. The bureau established completion of therapy for all patients with TB disease as its number one priority. To ensure progress toward achieving this goal, the bureau has:

- Developed new policies and guidelines for tuberculosis control in Missouri.
- Defined and advocated DOT as the standard of care.
- Issued a new TB Control Manual to all local health departments, medical providers, nursing homes, hospitals, correctional facilities, drug treatment centers, etc.
- Coordinated governmental agency involvement.
- Involved community-based organizations, minority groups and voluntary agencies to support and advocate the need for TB control and prevention in their community.
- Developed a program and referral system with local health departments to provide access to TB care for uninsured clients in rural areas (TB Diagnostic Program).
- Established an incentive program through ALA to assist TB patients to complete treatment.

In Missouri, local health departments have made significant progress in implementing DOT in their respective areas. In 1990, only 5 (1.6%) of the 312 patients were on DOT. Four of these five cases were in the metropolitan areas of the state. Data for 1995 shows that 143 (58.6%) of the 244 cases reported in 1995 were placed on DOT. See Figure 1.

While the metropolitan areas of Missouri have made significant progress in implementing DOT, the rural part of the state has shown less success, as depicted in Figure 2. The Department of Corrections has all inmates with TB disease on supervised therapy, while Kansas City has over 90 percent, Springfield/Greene County 80 percent, St. Louis County 68.8 percent and St. Louis City 67.5 percent. The Southwestern District was able to place over 65 percent of its cases on DOT, the Northwestern District 38.9 percent, the Southeastern District 31.7 percent, the Northeastern District 25 percent, the Eastern District 22.2 percent and the Central District 8.3 percent.

The high rate of utilization of DOT in large urban areas of Missouri may in large part be due to greater resources and

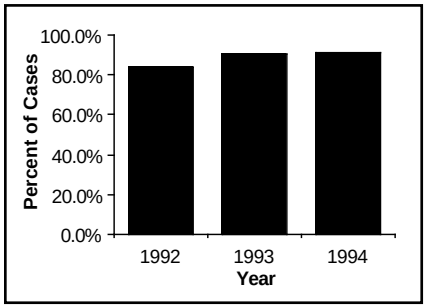


Figure 3. Percent of TB cases completing treatment within 12 months, Missouri, 1992–94.

clustering of cases within relatively close proximity to the medical care providers. Rural medical providers, who see few TB cases over the years, may not be aware of the need to place their patients on DOT or to make referrals to the local health departments in order to enroll their patients in the program. Still another problem is the misconception that DOT can only be performed by a nurse or a healthcare professional. Anyone can be trained to observe and document the patient taking medication. In St. Louis City, St. Louis County and Kansas City, outreach workers are assigned to do DOT. In other local health departments, a nurse is assigned, and in other areas, a local pharmacy or nursing home staff will observe the patient taking the medication.

An indicator of program success is improvement in the percentage of patients

(continued on page 21)

HIV Infection in Childbearing Women in Missouri

(continued from page 17)
During the four-year period from 1991–94, the annual seroprevalence rate among Missouri childbearing women has averaged 0.053 percent, and has not shown substantial variation from year to year. Throughout this four-year period, the seroprevalence rate among black women has remained noticeably higher than the rate among white women.

Although the HIV seroprevalence rate in Missouri childbearing women has remained generally stable in recent years, and although it has been lower than the nationwide rate, there are still reasons for concern. Women in Missouri are becoming increasingly affected by the HIV/AIDS epidemic, and most of those infected with the virus are of childbearing age. The growing involvement of women in the epidemic is reflected in the increasing numbers of female AIDS cases, and also in the fact that women appear to be making up a larger proportion of more recently infected persons. In addition, heterosexual contact appears to be an increasingly important route for acquiring HIV infection in Missouri, and the result will likely be an increasing number of childbearing-age women who will become infected.

The occurrence of HIV infection in women of childbearing age, and in the children to whom they give birth, must continue to be monitored. In addition, effective mechanisms must be in place to: a) assist uninfected women (and men) in making necessary behavioral changes to ensure that they remain uninfected; b) identify those women who are infected before they become pregnant or, if already pregnant, as early as possible in pregnancy; and c) ensure that all clinicians providing care to HIV-infected pregnant women are knowledgeable regarding current recommendations for the use of zidovudine to reduce the risk of perinatal transmission of the virus.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

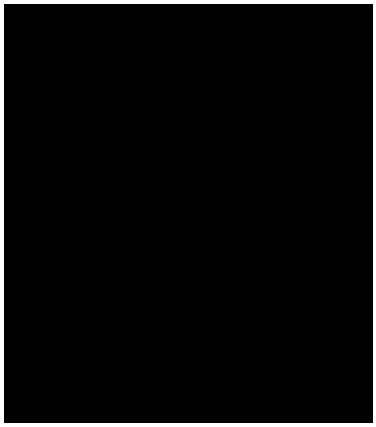
James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Jan 96	Feb 96	Total YTD
Specimens Tested	10,617	9,609	20,226
Initial (percent)	63.1%	62.6%	12,714
Repeat (percent)	36.9%	37.4%	7,512
Specimens: Unsatisfactory	197	162	359
HT Borderline	1,329	1,193	2,522
HT Presumptive	70	77	147
PKU Borderline	7	4	11
PKU Presumptive Positive	1	1	2
GAL Borderline	82	71	153
GAL Presumptive Positive	1	2	3
FAS (Sickle cell trait)	89	69	158
FAC (Hb C trait)	28	18	46
FAX (Hb variant)	12	17	29
FS (Sickle cell disease)	3	1	4
FSC (Sickle C disease)	3	1	4
FC (Hb C disease)	0	1	1

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Epidemiology Specialist Joins Office of Epidemiology

Nilsa E. Mack, M.P.H., joined the Office of Epidemiology as an Epidemiology Specialist in October 1995. She will provide epidemiologic consultation and technical assistance to various projects within the Division of Environmental Health and Epidemiology. Prior to joining the office, she worked for the Division of Chronic Disease Prevention and Health Promotion, on the Bootheel Heart Health Project and the Breast and Cervical Cancer Control Project. She has also worked as a Product Manager at Abbott Laboratories, Diagnostics Division.



Ms. Mack is a native of Puerto Rico and received her Masters Degree in Public Health at the University of Oklahoma. Currently, she resides in Jefferson City with her husband.

Directly Observed Therapy (DOT)

(continued from page 19)

completing treatment. Over the past few years, completion of therapy rates have increased in Missouri. In 1992, of all TB patients placed on therapy, 83.7 percent completed a full course of treatment within 12 months. In 1993, the percentage of those completing therapy jumped to 90.5 percent. The latest data (1994) shows that 91.6 percent of all TB cases completed therapy within 12 months. See Figure 3.

DOT is highly effective therapy. The success or failure to control the future spread of TB in Missouri will rest on how well the public and medical community is informed about the importance of DOT and the need for TB patients to complete their therapy.

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Heat Surveillance Summary - 1995

(continued from page 11)

prostration, weakness and collapse resulting from dehydration. Heat stroke is a severe illness caused by exposure to excessively high temperatures and is characterized by severe headache; high body temperature with a dry, hot skin; tachycardia; and in serious cases, collapse, coma or death.

Physicians, physician's assistants, nurses, hospitals, clinics or other private or public institutions providing care to any person diagnosed with or suspected of having hyperthermia should report it to their local health authority within 24 hours. Reports can be made by phone, facsimile or other means of rapid communication. For further information regarding reporting, call (800) 392-0272.

Prevention of Perinatal HIV Transmission

(continued from page 9)

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Survey of *Salmonella typhi* Isolates and Cases

Caryl Collier, R.N., M.P.H., C.I.C.
Bureau of Communicable Disease Control

The Missouri Department of Health is participating in a one-year *Salmonella typhi* survey being conducted by the Centers for Disease Control and Prevention (CDC). The survey requests isolates of *Salmonella typhi* from newly diagnosed symptomatic cases be sent for antibiotic sensitivity testing to the CDC via the Missouri State Public Health Laboratory. The CDC is also requesting that each case of typhoid fever be asked to answer questions from a standardized questionnaire administered by county or state public health staff.

The CDC survey is being conducted from June 1, 1996 through May 31, 1997. The primary purpose of the survey is to assess antimicrobial resistance among *Salmonella typhi* isolates in the United States. There are two objectives: 1) to determine the state-specific prevalence of antimicrobial resistance among *Salmonella typhi* isolates submitted to state and territorial public health laboratories during a one year period and 2) to determine the epidemiologic characteristics and clinical outcomes associated with antimicrobial-resistant *Salmonella typhi* infections compared with antimicrobial-susceptible infections.

For the ten-year period, 1985–94, complete susceptibility data are available from CDC for only three antimicrobial agents (ampicillin, chloramphenicol and trimetho-prim-sulfamethoxazole) and only 330 (13%) *S. typhi* isolates. Isolates from 1990-94 were more likely than isolates from 1985-89 to be resistant to any of one of these antimicrobial agents (30% vs. 12%, $p < 0.0001$) and to be resistant to all three agents (20 [12%] of 168 vs. 1 [0.6%] of 162, $p < 0.0001$).

Over the past 15 years, cases of typhoid fever reported in Missouri have ranged from one to ten cases with a mean of 4.5 and a median of four per year.

If you have questions regarding the submission of an isolate to the Missouri State Public Health Laboratory, please call Barbara Owen at (573) 751-0633. Questions pertaining to epidemiology or the questionnaire should be directed to Michael Fobbs, Bureau of Communicable Disease Control at (573) 751-6113.

Governor Carnahan's Immunization Initiative

Mary Ann Harder, M.S.
Bureau of Immunization

During a formal press conference on January 31, 1996, Governor Mel Carnahan kicked off a plan to improve the immunization levels of two-year-old children in Missouri. The plan calls all sectors of the population to action. Missouri ranks 48th in the United States for two-year-old immunization levels. Only 67 percent of Missouri's children have received the basic immunizations they need by age two, according to the National Immunization Survey conducted by the Centers for Disease Control and Prevention (CDC).[1] Governor Carnahan and the Missouri Department of Health are committed to increasing immunization levels of children two and under to 75 percent during 1996, and to 90 percent in 1997.

The action plan to achieve these goals consists of four main components:

- Increased public awareness of immunization
- Improved access to, and availability of, vaccines
- Implementation of a statewide immunization information system
- Broad-based participation by healthcare providers

The public awareness component is designed to educate and motivate parents to immunize their children on time. Through involvement of the print and broadcast media, the message will be conveyed that immunization is an ongoing process. It will be stressed that this process requires at least five visits for immunization by the second year, and that parents are responsible to ensure that their children are fully immunized (see slogan in box below).

Community coalitions in Missouri are already implementing outreach activities. The Mid-America Immunization Coalition, for example, has announced a project called Bee Wise Mondays. This is a cooperative effort involving all area local health agencies, federally qualified health centers and Children's Mercy Hospital in Kansas City, and has as its goal the extension of immunization clinic hours one evening per week. Civic groups are assisting in this project by promoting and distributing immunization information.

Another example of an effort to increase public awareness of immunization is a greeting card developed and donated by Hallmark Cards. The card is being mailed to the parents of 2-month-old infants. Besides carrying a personal congratulatory message from the governor and first lady, it also encourages parents to start their child's immunization series on time.

Improving access to immunization involves many issues, and requires the involvement of numerous persons and organizations. The Community Health Assessment Resource Team (CHART) Partners have been disseminating immunization information in their newsletters and mailings, as well as providing the latest information on immunization to their members. The Missouri Hospital Association is assisting the Bureau of Immunization in implementing an outreach program in its member hospitals. This program, named Missouri Smart Start, will pair volunteers with new mothers to remind them at periodic intervals throughout the first year to have their child immunized. The Missouri Association of Osteopathic Physicians and Surgeons showcased the immunization clinic assessment software program at their District Presidents Meeting this spring. CHART Partners conducted awareness activities for National Infant Immunization Week in April. Numerous additional activities are planned, including an assessment of

Reasons for Low Vaccine Coverage in Missouri

- Lack of parental awareness and motivation for complete and timely immunization
- Lack of access to immunizations and inadequate performance of the health care system
- Parents who have not witnessed the severe illness resulting from diseases like whooping cough or polio and are, therefore, not as motivated to ensure that all immunizations are completed on schedule
- Policies which require advance appointments rather than providing immunization on request
- Policies that require comprehensive physician evaluations when appointments for such evaluations may take weeks to obtain
- Use of unwarranted contraindications, such as minor illness, to defer immunization
- Failure to administer all needed vaccines simultaneously rather than referring the child for multiple visits
- Failure to assess the child's immunization status and offer needed vaccines
- Insufficient state and local resources resulting in inadequate nursing staff, clinic hours and limited clinic locations
- Non-coverage of immunizations by insurers, so private providers are forced to pass on costs to parents or to refer the parents to public clinics, leading to further fragmentation of care and delays in receiving the immunizations

Immunize, Five Visits by Two, It's Up to You

provider immunization levels and a provider practice survey with the involvement of the provider organizations.
Legislation that will improve insurance coverage for immunization and expand parental authority for consent was one of Governor Carnahan's top priorities for the 1996 session. Lawmakers have subsequently been able to reach agreement on these issues, and legislation has passed both houses of the General Assembly. The governor is expected to sign the final bill into law in June.

Through the Vaccines for Children Program (VFC), which is a national entitlement program, vaccines are being supplied without charge to providers for children up to 18 years of age who meet certain guidelines.

Linking immunization and Women, Infant and Children (WIC) services also improves access and is effective in raising immunization rates. WIC is the largest single point of access for preschool children. Approximately 40 percent of all births in Missouri participate in WIC. The WIC and immunization programs are collaborating to provide screening, referral and on-site immunizations for WIC infants and children. These programs are pooling resources and working together to automate the systems, linking databases so that clients can be accurately and efficiently screened for immunizations at every encounter.

Expanding sites and hours for immunizations also improves access. The Bureau of Immunization has contracts with all of the local health agencies and eleven of the fourteen community health centers in Missouri to provide additional resources to improve their vaccine delivery infrastructure. The funds assist agencies to increase their immunization clinic hours and locations by paying for additional nursing and clerical staff.

Immunization information tracking systems (known as MITS, KCIIS or SLIIS in different areas of the state) are being implemented to allow for computerized recordkeeping, access to the immunization history when a child presents for services, and automated reminder and recall activities to help keep children on schedule. Data from other states show that information systems like Missouri's, with reminder/recall capabilities, are effective in improving immunization levels. These systems are available to practitioners without charge.

The fourth component, broad-based health care provider participation, consists of programs that offer assessment and quality assurance services, as well as continuing medical education on the changing field of immunizations. Healthcare providers are encouraged to utilize immunization information systems. Computerized quality assurance systems are available to assess office/clinic immunization levels, and to demonstrate whether all opportunities are being utilized to provide immunizations at provider offices and clinics. Software for this is offered without charge. Assessment of immunization levels, and accompanying analysis and interpretation, has been shown to be effective in increasing immunization levels within practices.

The governor's plan is comprehensive, and includes many approaches to solving the most critical immunization problems. This plan will be essential for reaching the 1996 and 1997 immunization goals in Missouri. By involving all sectors of the population, a widespread effort to meet these goals has already been initiated.

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How Does VFC Work?

MISSOURI VFC
Vaccines for Children
Bee Wise. Immunize.

Providers may enroll at any time. Every attempt has been made to keep this program as simple as possible for busy providers. To participate in the VFC Program, providers need to agree to:

1. Screen the patient for eligibility on the first visit (verification of their status is not required);

2. Follow the Recommended Childhood Immunization Schedule—United States, January 1995, endorsed by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) and the American Academy of Family Practitioners (AAFP). This schedule was published in the January-February 1996 issue of the *Missouri Epidemiologist*;

3. Not charge for the VFC-supplied vaccine (although an administration fee may be charged);

4. Provide vaccine information materials as prescribed by law (required of all providers, regardless of their enrollment status in the VFC Program).

A one-time enrollment form agreeing to these standards will be kept on file at the Department of Health.

Vaccine will be delivered directly to the provider's office or designated delivery site. Once providers receive VFC vaccine, they need not worry about separating VFC vaccine from their other stock.

Packets with more information on VFC, as well as enrollment forms, are available by contacting the Bureau of Immunization, Vaccines for Children Program at (800) 219-3224.

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The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by Mahree Skala, MA, Deputy Director, of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

Upcoming Conference

THE ESSENTIALS OF INFECTION CONTROL
6TH ANNUAL CONFERENCE

September 4–6, 1996
Capitol Plaza Hotel, Jefferson City, MO

Purpose
This three-day conference is a starting point to prepare healthcare professionals as facilitators and resource persons in the prevention and control of common nosocomial infections. It will aid the professional in developing the skills required to manage the everyday responsibilities of infection surveillance, analysis of disease data and problem identification and resolution. Important resources for assistance will also be learned.

Sponsors
Co-sponsored by the Missouri Department of Health and eight other organizations.

You Should Attend If You Are A:
Healthcare professional new to the field or the tasks of an infection control professional, or who assists with:

- the infection control program in any healthcare setting (acute care, ambulatory care, home health, long term care, mental health, public health, rehabilitation, other)
- consultation on infectious disease prevention and control
- outbreak investigation and follow-up
- surveys, investigations or licensing activities relevant to infection control practices.

Registration
For a complete conference brochure and registration form, call (573) 751-6115.

Missouri EPIDEMIOLOGIST

Volume XVIII, Number 3 *May–June 1996*

Bureau of Communicable Disease Control 1995 Annual Report

Michael Fobbs, B.A.
Bureau of Communicable Disease Control

Enteric Diseases

Enterics are some of the most common diseases associated with foodborne illness. In Missouri, shigellosis was the most common bacterial enteric disease reported in 1995.

Shigellosis increased dramatically in 1995, increasing by 74 percent from 654 cases in 1994 to 1,138 cases. Increases were seen in the Central and Northwestern districts, both of which also reported outbreaks of hepatitis A. See Figure 1. Eastern district also showed a very large increase in shigellosis. Reductions in the number of reported cases were seen in the Northeastern and Southwestern districts. Large scale increases in shigellosis associated with hepatitis A outbreaks or hyperendemic shigellosis in urban areas will be further studied

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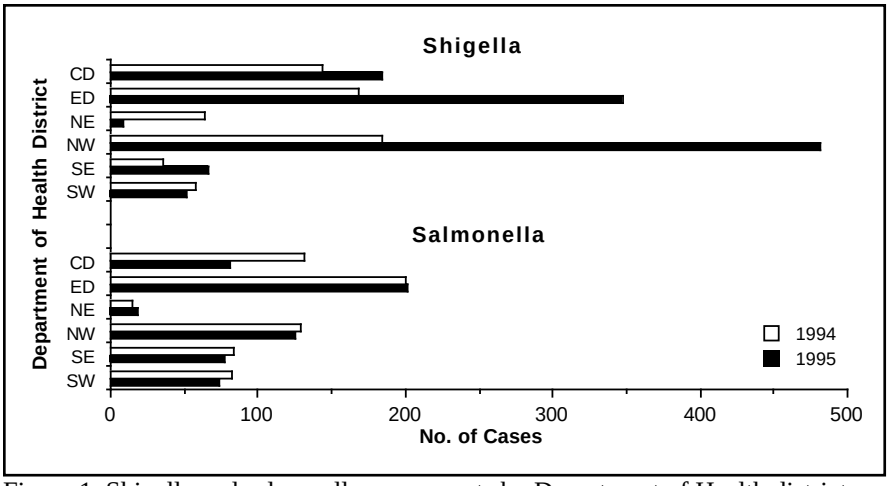

Figure 1. Shigella and salmonella case reports by Department of Health district, Missouri, 1994 and 1995.

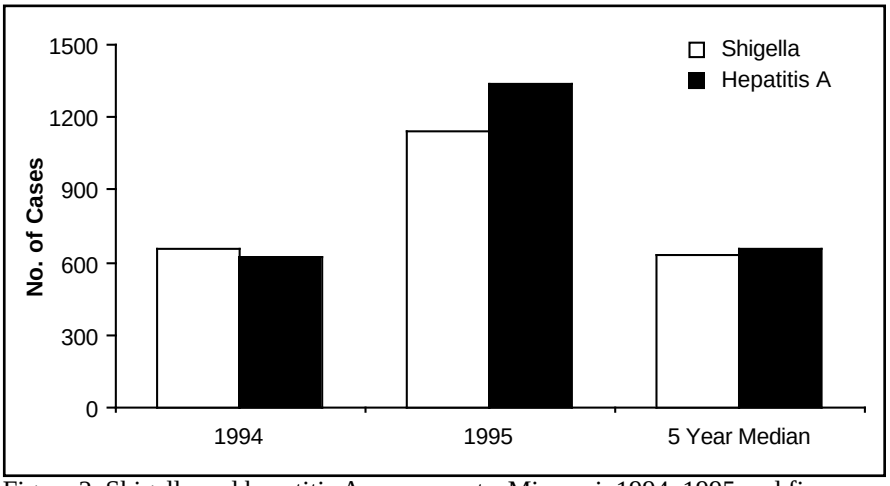

Figure 2. Shigella and hepatitis A case reports, Missouri, 1994, 1995 and five-year median.

Inside this Issue...

(continued from page 1)
using population demographics to describe the trends. The 1995 incidence was 80.9 percent higher than the five-year median* of 629 cases. See Figure 2. The majority of cases reported (76.6%) were *Shigella sonnei*.

Salmonellosis decreased in all districts except the Northeastern and Eastern in 1995, and those increases were minor. See Figure 1. The number of reported cases fell 10.1 percent, from 642 in 1994 to 577 in 1995. The 1995 incidence was 6.0 percent below the five-year median of 617 cases. See Figure 3. The most common serotypes of salmonella reported in 1994 and 1995 are shown in Table 1.

There were 48 *E. coli* O157:H7 cases reported during 1995. The highest number of cases (15) was reported from the Eastern District, perhaps because Childrens Hospital in St. Louis routinely tests for this pathogen. The second highest number of cases (10) was reported from the Southwestern District. St. John's Regional Health Center in Springfield also routinely tests for *E. coli* O157:H7 and efforts have been made in the Southwestern District to educate laboratory and hospital staff to suspect *E. coli* as a cause of diarrheal illness. The reported number of cases is too small at this time to determine if the unexpectedly large proportion of cases from the Southwestern District represents a true reporting trend. See Figure 4. This was the third complete year of reporting. By 1998, with more than five years of data, the analysis of trends for this disease will be more meaningful. There is still significant under-detection

*The five-year median was calculated using the annual totals from 1990–94.

Key to Department of Health Districts:

CD = Central District
ED = Eastern District
NE = Northeastern District
NW = Northwestern District
SE = Southeastern District
SW = Southwestern District

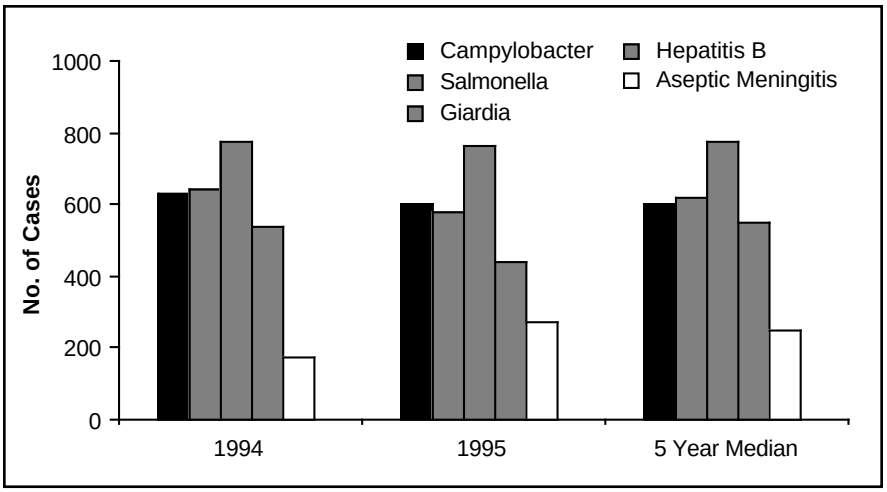

Figure 3. Campylobacter, salmonella, giardia, hepatitis B and aseptic meningitis case reports, Missouri, 1994, 1995 and five-year median.

Table 1. Most common *Salmonella* serotypes, Missouri, 1995 and 1994

	1995			1994		
	Serotype	No. of Cases	Percent	Serotype	No. of Cases	Percent
1.	*S. typhimurium*	129	22.4%	*S. typhimurium*	155	24.1%
2.	*S. enteritidis*	83	14.4%	*S. enteritidis*	52	8.1%
3.	*S. newport*	38	6.6%	*S. brandenburg*	51	7.9%
4.	*S. javiana*	32	5.5%	*S. agona*	31	4.8%
5.	*S. heidelberg*	28	4.9%	*S. newport*	25	3.9%
6.	*S. muenchen*	13	2.3%	*S. heidelberg*	24	3.7%
7.	*S. poona*	13	2.3%	*S. thompson*	21	3.3%
8.	*S. bareilly*	11	1.9%	*S. hadar*	17	2.6%
9.	*S. saint paul*	9	1.6%	*S. senftenberg*	16	2.5%
10.	*S. braenderup*	8	1.4%	*S. norwich*	15	2.3%
	S. oranienburg	8	1.4%			
	S. hadar	8	1.4%			
	All Others	197	34.1%	All Others	235	36.6%
	Total	**577**	**100.0%**	**Total**	**642**	**100.0%**

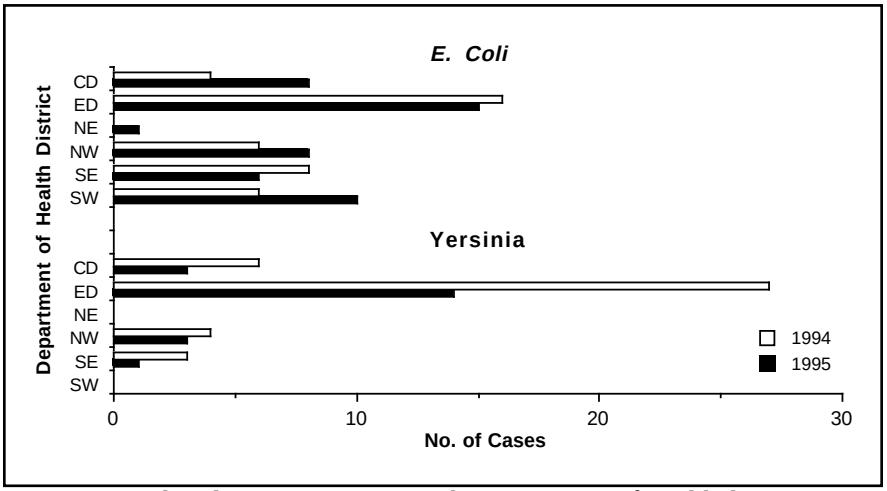

Figure 4. *E. coli* and yersinia case reports by Department of Health district, Missouri, 1994 and 1995.

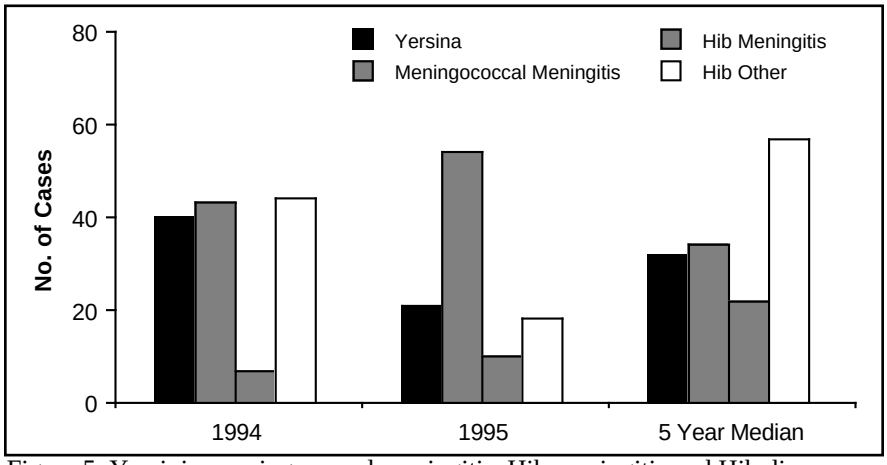

Figure 5. Yersinia, meningococcal meningitis, Hib meningitis and Hib disease other than meningitis case reports, Missouri, 1994, 1995 and five-year median.

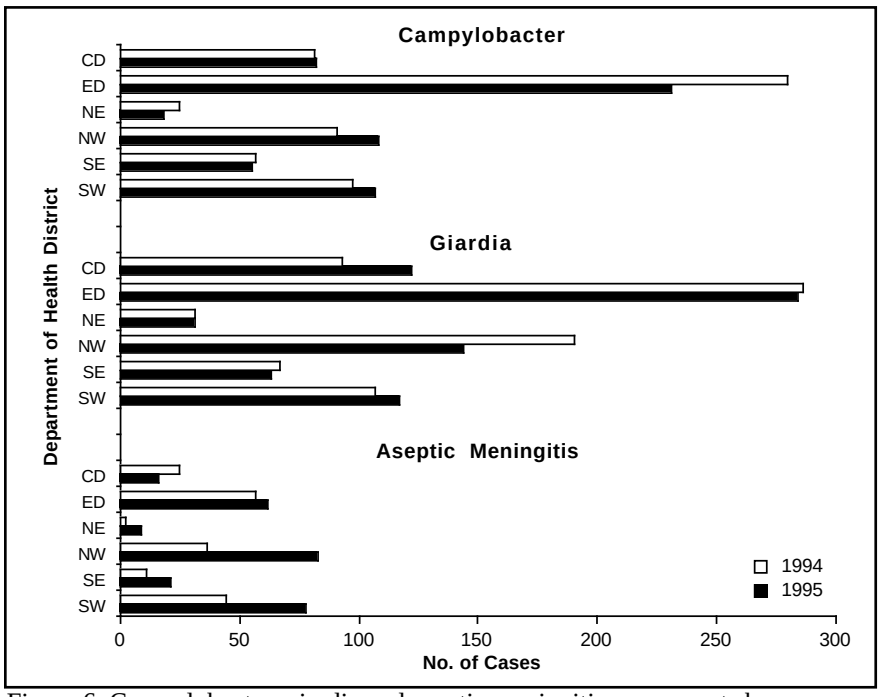

Figure 6. Campylobacter, giardia and aseptic meningitis case reports by Department of Health district, Missouri, 1994 and 1995.

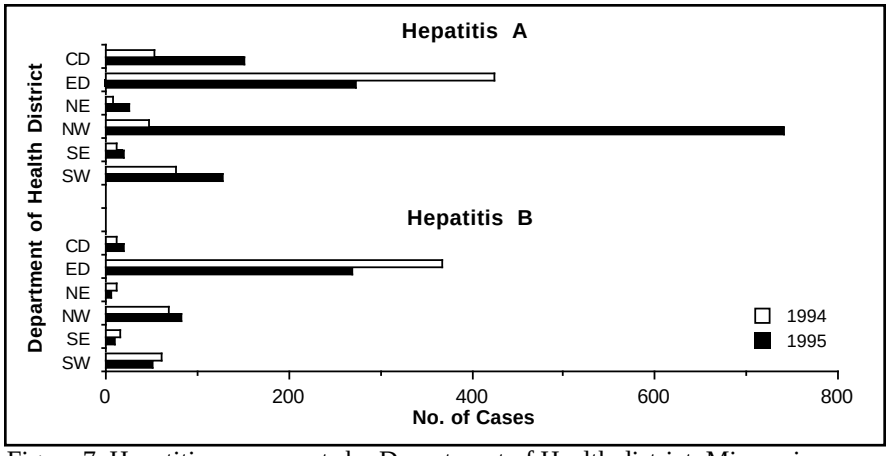

Figure 7. Hepatitis case reports by Department of Health district, Missouri, 1994 and 1995.

and under-reporting of this pathogen, which prospective studies in other states have found to be more common than shigella.[1]

The number of reported cases of *Yersinia enterocolitica* decreased 47.5 percent from 40 cases in 1994 to 21 cases in 1995. The 1995 incidence was 34.0 percent below the five-year median of 32 cases. See Figure 5. As in the past, the largest number of cases was reported among black children in the Eastern district. See Figure 4.

Reported campylobacter cases decreased from 631 cases in 1994 to 601 cases in 1995, a change of 4.8 percent. Central, Southwestern and Northwestern districts showed slight increases in the numbers of reported cases while the other districts showed decreases. See Figure 6. The 1995 incidence was not significantly different from the five-year median of 602 cases See Figure 3.

Parasites

Giardia is the only parasitic disease we routinely track through our surveillance system. Reported cases of this disease decreased slightly by 1.7 percent, from 774 cases in 1994 to 761 cases in 1995. Cases increased during 1995 in the Central and Southwestern districts with decreases being seen in the other areas of the state. See Figure 6. The 1995 incidence was 1.7 percent below the five-year median of 774 cases. See Figure 3.

Viral Hepatitis

Hepatitis A in Missouri increased by 116.2 percent from 619 cases in 1994 to 1,338 cases in 1995. Outbreaks occurred in the Northwestern and Central districts increasing the total number of reported cases in the state despite a large decrease in the number of cases in the Eastern District. Increases were also seen in the Northeastern and Southwestern districts. See Figure 7. The 1995 incidence was 104.9 percent higher than the five-year median of 653 cases. See Figure 2.

(continued on page 4)

(continued from page 3)
Hepatitis B cases decreased by 18.8 percent, from 538 cases in 1994 to 437 cases in 1995. All districts, except the Northwestern and Central, reported decreases in the number of reported cases. See Figure 7. The 1995 incidence was 20.4 percent lower than the five-year median of 549 cases. See Figure 3.

Meningococcal Disease

There was a 25.6 percent increase in meningococcal meningitis from 43 cases in 1994 to 54 cases in 1995, following a trend of increasing cases for the past two years. The Eastern, Northeastern, Southwestern and Central districts reported increases in the number of cases in 1995. See Figure 8. A large proportion of the cases from the Southwestern District were reported from the Joplin area. A team from the Centers for Disease Control and Prevention (CDC) was invited to participate in an investigation of meningococcal meningitis cases in that area. The CDC, Department of Health, local health agencies, hospital infection control professionals and physicians assisted in the March 1996 case control study. The results of this investigation are pending. The 1995 incidence was 58.8 percent higher than the five-year median of 34 cases. See Figure 5.

Although meningococcal meningitis increased, other invasive meningococcal disease decreased by 37.1 percent from 35 cases in 1994 to 22 cases in 1995. Information on other invasive meningococcal disease has only been collected since 1994.

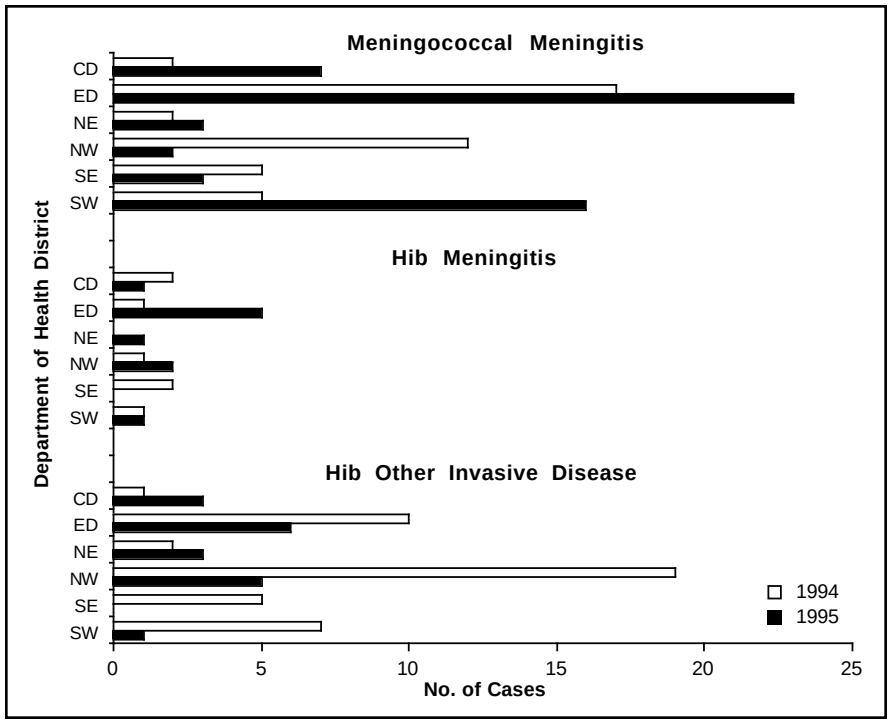

Figure 8. Meningococcal meningitis,Hib meningitis and Hib disease other than meningitis case reports by Department of Health district, Missouri, 1994 and 1995.

Aseptic meningitis is a disease of unknown etiology with many different causes. Surveillance of this disease is now focusing on detection of outbreaks. Aseptic meningitis increased by 53.7 percent from 175 cases in 1994 to 269 cases in 1995. This is 9.3 percent higher than the five-year median of 246 cases. See Figure 3. Increases were seen in all health districts, except the Central District. The Northwestern District experienced a 130.5 percent increase and the Southwestern District increased by 77.3 percent. See Figure 6.

Haemophilus influenzae type b (Hib) Disease

Reversing a trend seen since the introduction of the vaccine, 1995 saw a slight increase of Hib meningitis cases over those reported in 1994. Ten cases were reported in 1995 compared with seven in 1994, representing a 42.9 percent increase. Six of the ten cases (60%) were <5 years of age. The 1995 incidence was 54.5 percent lower than the five-year median of 22 cases. See Figure 5. The area of greatest increase was the Eastern

(continued on page 35)

CDC Requests Serotyping of *Haemophilus influenzae* (Hi) Isolates

Following the introduction of *Haemophilus influenzae* type b (Hib) conjugate vaccines there has been a dramatic decline in the incidence of invasive Hib disease among children <5 years of age. As a result, Hib invasive disease in this age group is targeted for elimination. To meet this elimination goal, every case of invasive *Haemophilus influenzae* (Hi) must be detected, promptly investigated and reported. Among all Hi, only disease caused by serotype b strains can be prevented by vaccination. Thus, it is critical that the following information be available for each case: 1) serotype of the Hi isolate, 2) vaccination status of the case and 3) specimen source of the isolate (e.g., blood, cerebrospinal fluid or joint fluid).

Hib still accounts for a substantial proportion of invasive Hi disease among children. Because of the importance of serotype, the Centers for Disease Control and Prevention requests that all Hi isolates be serotyped. The absence of data on serotype and vaccination status makes it difficult to track the changing epidemiology of invasive Hib disease, assess the impact of vaccination programs, evaluate vaccine failures and identify under-vaccinated age groups.

Laboratories that do not routinely perform serotype testing should send all Hi isolates to the State Public Health Laboratory. This is particularly important for isolates from persons <5 years of age.

Vaccine-Preventable Disease 1995 Annual Report

Mary Ann Harder, M.S.
Bureau of Immunization

The mission of the Bureau of Immunization is to prevent disease, disability and death caused by vaccine-preventable diseases in children and adults. Vaccines are the most powerful way to prevent infectious diseases like measles, mumps, rubella, tetanus, diphtheria, pertussis, hepatitis B, polio and invasive disease from *Haemophilus influenzae* type b. Together with partners in public health, professional groups, community-based organizations, industry, academia, volunteer organizations and national organizations, the bureau ensures that vaccines reach those who need them. Vaccines have led to the worldwide eradication of smallpox, and the elimination of polio from the Americas. Progress toward worldwide eradication of polio by the year 2000 continues. *Haemophilus influenzae* type b, once the most common cause of bacterial meningitis in the United States, has declined by more than 95 percent. The Vaccines for Children Program (VFC) was initiated in October 1994. This program is designed to provide free vaccine to more children than ever before and allow more parents to receive free vaccine for their children through their primary provider, whether at a clinic or private health care. Widespread use of vaccines, particularly among children, has resulted in the lowest levels of vaccine-preventable disease ever reported in the nation.

There were no reported cases of rubella in Missouri in 1995, but one case of congenital rubella syndrome was reported. The mother of the infant reported no rash illness during her pregnancy, but the infant is deaf and had sera positive for rubella IgM antibody. Prevention of congenital rubella syndrome is the main objective of rubella vaccination programs in Missouri and throughout the United States.

Sixty-three cases of pertussis (whooping cough) were reported in 1995, an increase from 45 cases in 1994. Cases occurred in all health districts of the state and did not appear to be epidemiologically linked. See Figure 1. Forty of the cases (63%) occurred in infants 6 months of age and under. Cases of pertussis continue to occur, only partially because of incomplete immunization coverage. Babies may have been infected by older children and adults whose immunity to pertussis has waned. Multiple doses of vaccine and regular boosters are required for children under 7 years of age, limiting the usefulness of vaccination as a measure for outbreak control. Continued research must be done to develop a pertussis vaccine that is safe and effective for those over 7 years of age in order to further reduce the incidence or pertussis.

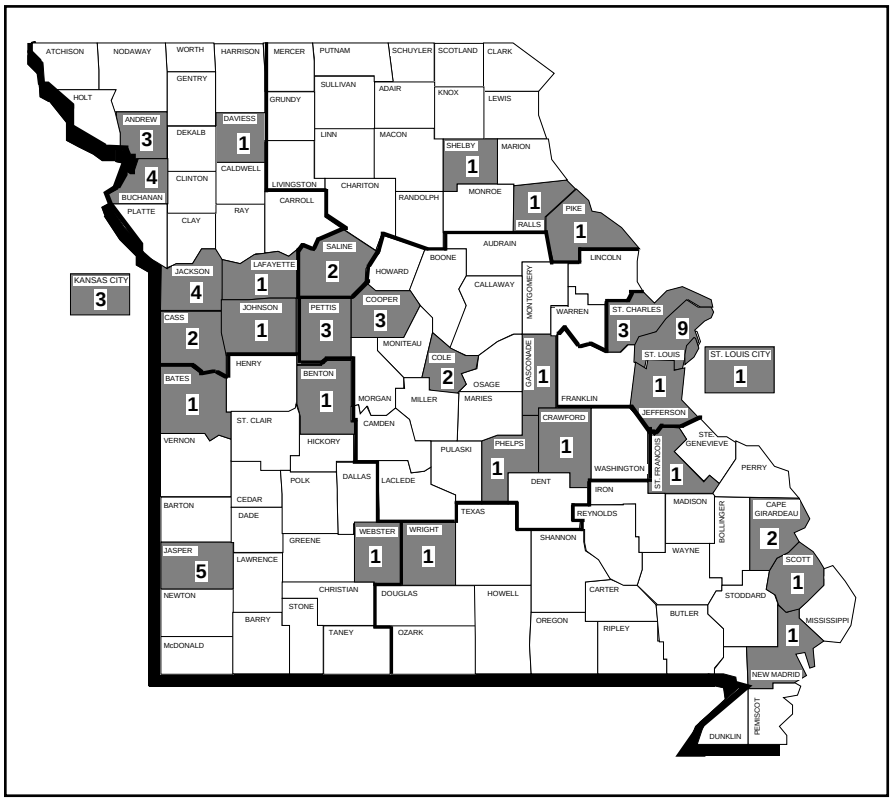

Figure 1. Reported pertussis cases by county, Missouri, 1995.

In 1995, there were two reported cases of measles (rubeola), compared with 161 cases in 1994. Although the cases were unrelated, both 1995 cases were immunized teenagers in the Central District whose acute serology tests were positive for measles IgM but whose convalescent sera were negative for measles IgG antibody. Although they met the national clinical case definition for measles, it is possible that they represent "false positive" laboratory test results.

Three cases of tetanus were reported during 1995. Two of the cases, men ages 37 and 35, reported being previously immunized. The third case was a 3-year-old child who was unimmunized because his parents had a religious objection to immunization. The diagnosis of tetanus is entirely clinical. There are no characteristic laboratory findings.

It is imperative that immunization rates in Missouri be raised to, and then maintained at, a higher level than we have currently achieved. The Missouri Department of Health is working with both public and private providers to reach the goal of completely immunizing 90 percent of Missouri's 2-year-olds by 1997.

Outbreaks of Communicable Disease in 1995*

Michael Fobbs, B.A..
Bureau of Communicable Disease Control

In 1995, there were 50 communicable disease outbreaks reported in Missouri involving 880 people. This is a decrease of 23.1 percent from 65 outbreaks reported in 1994. The outbreaks involved many different modes of transmission and several widely varying etiologic agents, and they occurred in a variety of settings. The modes of transmission were as follows: 24 were suspected person-to-person , 23 were foodborne, two were waterborne and in one outbreak the mode of transmission was suspected to be an insect vector.

During 1995, restaurants were the most common setting for outbreaks, accounting for 12 (24%) of the reported outbreaks; schools were second with ten outbreaks (20%); child care settings were involved in seven outbreaks (14%); community wide outbreaks accounted for six (12%); private homes accounted for five outbreaks (10%); and hotels and catered events accounted for two outbreaks each (4%). Individual outbreaks occurred in a camp, group home, hospital outpatient clinic, factory, nursing home and local jail. The outbreaks are shown in Table 1 by cause, setting and number of cases.

Table 1. Communicable disease outbreaks by cause, setting and number of cases, Missouri, 1995.

Disease/ Mode of Transmission	No. of Outbreaks	Setting	No. of Cases
Acute Gastrointestinal Illness of Unknown Etiology			
Foodborne	18	CA, CT, 3F, GH, H, 11R	239
Person-to-Person	3	CC, 2S	214
Shigellosis			
Foodborne	1	S	100
Person-to-Person	7	4CC, 3S	118
Hepatitis A			
Person-to-Person	4	2C, S, W	24
Salmonellosis			
Foodborne	4	CT, F, P, R	62
Pneumonia	2	HO,S	16
Scabies	1	S	30
Pediculosis	1	S	27
Cryptosporidiosis (Waterborne)	1	CC	15
Campylobacteriosis (Waterborne)	1	C	8
Giardiasis	1	NH	7
Enterovirus	1	F	5
Aseptic Meningitis (Vectorborne)	1	C	4
Viral Rash	1	CC	4
Meningococcal Infection	1	C	3
Legionellosis	1	H	2
Severe Esophagitis	1	C	2
TOTAL	**50**		**880**

Key

C	Community	GH	Group Home	P	Prison
CA	Camp	H	Hotel	R	Restaurant
CC	Child Care Setting	HO	Hospital	S	School
CT	Catered Event	NH	Nursing Home	W	Workplace
F	Family Gathering				

The largest single event was a school outbreak of acute gastrointestinal illness of unknown etiology (AGI) that affected 160 people. The largest proportion of outbreaks reported during 1995 consisted of AGI, with 21 outbreaks affecting 453 people. Foodborne transmission was the most common mode, implicated in 18 of these outbreaks. The other three outbreaks resulted from person-to-person transmission. AGI outbreaks occurred in the following settings: 11 restaurants, three homes, two schools, one hotel, one catered event, one camp, one child care setting and one group home.

Shigellosis was reported as the causative agent for eight outbreaks involving 218 people. Seven outbreaks involved person-to-person transmission, and one was transmitted by food. Settings for shigellosis outbreaks included four schools and four child care settings.

Four hepatitis A outbreaks affecting 24 people were reported. In each instance, transmission of the virus was person-to-person. The settings were two communities, a school and a factory. Although

*Excludes outbreaks related to HIV, sexually transmitted diseases, tuberculosis, vaccine-preventable diseases and zoonotic diseases. These disease outbreaks are covered in other articles in this issue.

Missouri experienced a 116.2 percent increase in hepatitis A cases in 1995, most of the cases were sporadic and widespread with insufficient commonality to be considered an "outbreak."

Salmonellosis was the causative agent in four outbreaks that affected 62 people. All were foodborne outbreaks; one in a home, one at a catered event, one in a jail and one in a restaurant.

Two outbreaks of pneumonia were reported affecting a total of 16 people; one in a hospital outpatient clinic and the other in a school.

Scabies was the causative agent in an outbreak in a school involving a total of 30 people. A waterborne outbreak of cryptosporidiosis associated with a water fountain in a child care setting involved 15 people. Campylobacter was found in eight people who drank unboiled water from a public water supply after a boil order had been issued. Aseptic meningitis transmitted by mosquito vectors was suspected in an outbreak of illness that affected four people in a community. A viral rash was the suspected cause of an outbreak affecting four people in a child care setting. A cluster of three meningococcal meningitis cases occurred in a small community and was almost overshadowed by the trend of increased reporting of meningococcal disease in some parts of the state. Legionellosis affected two individuals who traveled and stayed at a hotel.

A two-person outbreak of severe esophagitis was investigated. Both cases were hospitalized. Extensive interviewing was conducted to determine food history and exposure to corrosive or noxious chemicals. No environmental exposure could be identified. The agent involved was never determined.

Other outbreaks reported included: 27 cases of pediculosis in a school, five cases of suspected aseptic meningitis determined to be enterovirus, and seven cases of giardiasis related to a meeting held in a nursing home with a special meal prepared by the nursing home cafeteria. There were no cases detected among nursing home staff or patients.

Table 2. Nosocomial outbreaks and investigations by cause, setting and number of cases, Missouri, 1995

Disease/ Mode of Transmission	No. of Outbreaks	Setting	No. of Cases
Scabies	13	H, 12NH	218
Acute Gastrointestinal Illness of Unknown Etiology Person-to-Person	8	8NH	399
Acute Respiratory Illness of Unknown Etiology	5	5NH	101
Influenza type A	2	2NH	52
Influenza-like	2	H, NH	22
Methicillin-resistant *Staphylococcus aureus*	2	H, NH	10
Norwalk-like Virus	1	NH	8
TOTAL	**33**		**810**

Key H Hospital NH Nursing Home

1995 Nosocomial Outbreaks

Hospitals and nursing homes in Missouri reported 33 institutionally-acquired (nosocomial) outbreaks of communicable disease during 1995. Altogether, 810 cases of illness were reported. This is a decrease of 31.3 percent from 48 outbreaks reported in 1994.

In all of the outbreaks, disease was transmitted person-to-person. Nursing homes were the setting for 30 (90.9%) of the outbreaks, and two hospitals and a hospital home health unit for the remaining three (9.1%). Table 2 shows the outbreaks by cause, setting and number of cases.

Scabies accounted for 13 (39.4%) of the 33 outbreaks, and involved 218 people. Twelve of these outbreaks occurred in nursing homes and one in a hospital. In all instances, the mite was transmitted person-to-person.

Outbreaks of AGI occurred in eight nursing homes and affected a total of 399 persons. The mode of transmission in each instance was person-to-person.

Five outbreaks of acute respiratory illness of unknown etiology (ARI) occurred in nursing homes and affected a total of 101 persons. The mode of transmission in each instance was person-to-person.

Two confirmed influenza outbreaks involving 36 people were reported in a nursing home and a hospital. Two outbreaks of influenza-like illness (22 cases) were reported in nursing homes.

Two outbreaks, involving ten people, were caused by methicillin-resistant *Staphylococcus aureus.* One of these outbreaks was in a nursing home and the other was in a hospital.

A nursing home was involved in an outbreak of Norwalk-like illness that affected eight patients. Mode of transmission was person-to-person.

Animal Rabies Surveillance - 1995

F.T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

Missouri continues to experience a low prevalence of rabies activity, with only 30 cases of animal rabies in 1995. Missouri has two reservoirs for rabies, the skunk, which is affected with two different strains, and the bat. Since 1990, Missouri has averaged only 31 rabies cases per year. See Table 1. This low incidence of rabies in Missouri is generally attributed to the low skunk population in the state. Since skunks are the main reservoir for rabies in Missouri, any fluctuation of population or disease in these animals affects the overall rabies picture in the state.

Nationally, bat rabies averages some 600–700 cases per year, uniformly distributed across the United States. Figure 1 shows the location of bat rabies cases in the United States in 1994. While bat rabies across the nation has been relatively constant, the effect of bat rabies on the human population has dramatically changed. In the United States from 1980 through 1995, there were 29 cases of human rabies. Twenty of these originated from exposures within the United States, and sixteen (80%) were the bat strain of rabies. Eight of the last ten human rabies cases originated from bats, with all cases in 1995 being of bat origin. The time and nature of bat exposure was unknown in most of these cases.

The number of bat rabies cases in Missouri during the past 25 years is shown in Figure 2. It is clear that bat rabies increased after 1981, with a peak in 1992 of 28 cases. The distribution of bat rabies in Missouri during the past ten years is shown in Figure 3.

The Centers for Disease Control and Prevention (CDC), has called for very careful evaluation of the requirement of rabies post-exposure treatment of individuals exposed to bats. When asked whether they have been bitten by an animal, most people visualize an open

Table 1. Animal Rabies Cases by Species, Missouri, 1986–95

Species	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Bat	10	15	12	22	12	15	28	21	9	8
Cat	0	5	2	1	0	0	1	1	1	1
Cattle	3	0	1	0	1	0	0	1	0	0
Dog	5	1	3	1	4	3	2	2	2	1
Horse	0	0	0	0	1	0	0	1	1	1
Fox	1	0	0	0	0	0	0	0	0	1
Skunk	55	38	18	38	12	9	6	10	14	18
Raccoon	0	0	0	0	0	1	0	0	0	0
Oppossum	1	0	0	0	0	0	0	0	0	0
Total	**75**	**59**	**36**	**62**	**30**	**28**	**37**	**36**	**27**	**30**

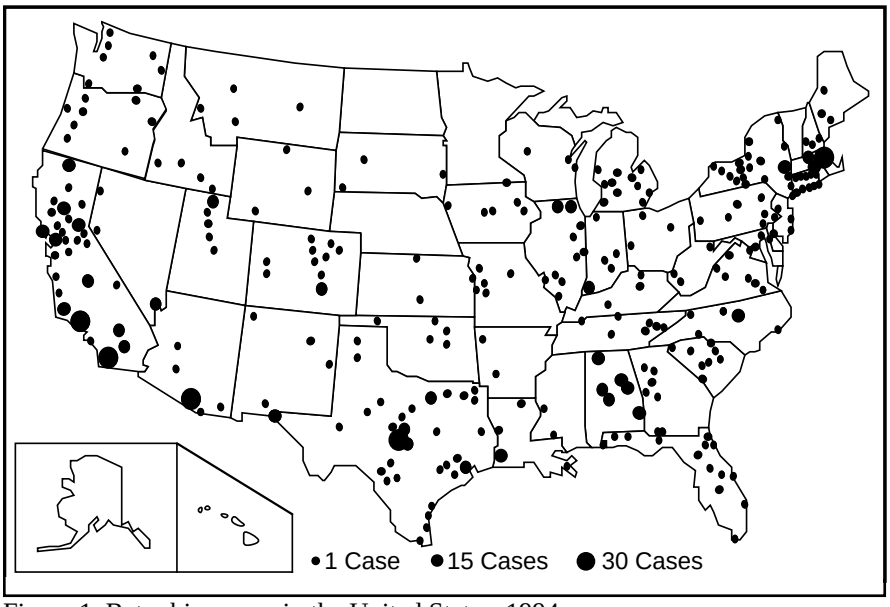

Figure 1. Bat rabies cases in the United States, 1994.

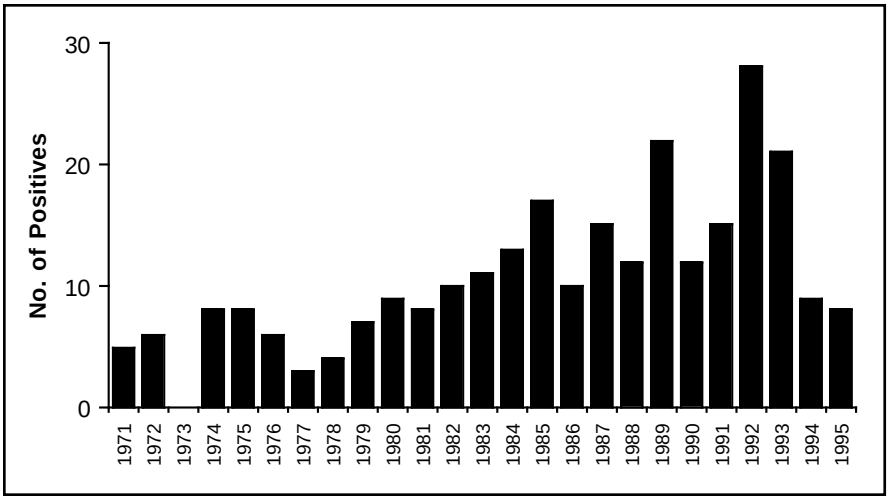

Figure 2. Bat rabies cases by year, Missouri, 1971–95.

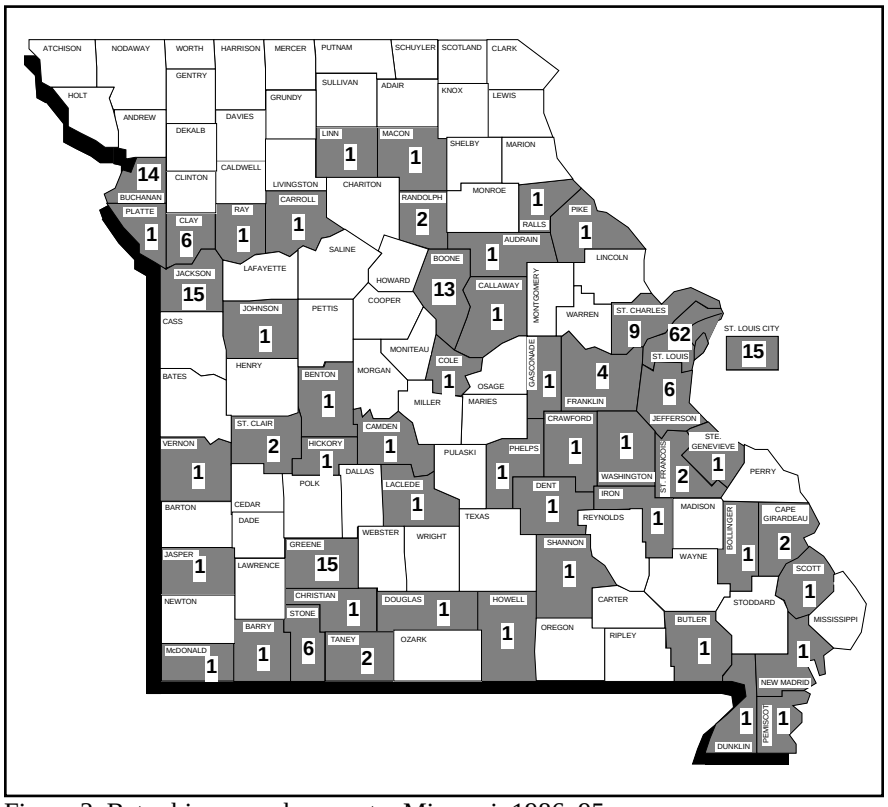

Figure 3. Bat rabies cases by county, Missouri, 1986–95.

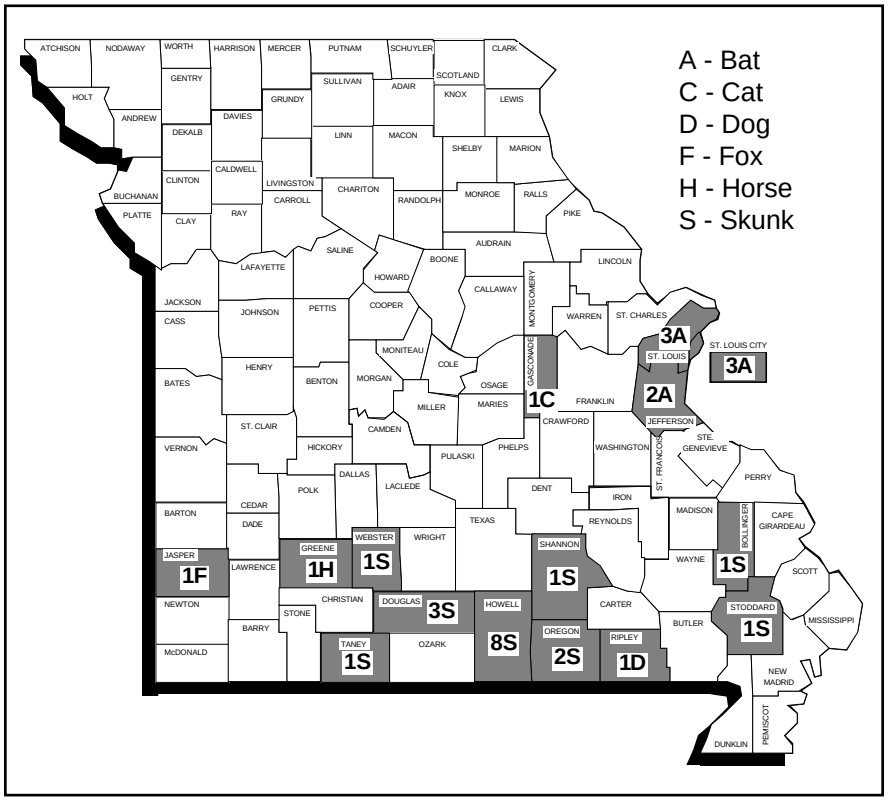

Figure 4. Animal rabies cases by county and species, Missouri, 1995.

bleeding wound. Because of the miniature nature of bats' teeth, this is not the picture presented after a bat bite. This is especially true in a child's recollection of a bite. Special precautions should be exercised by medical personnel in evaluating bat exposures.

Based on the latest evidence of the danger of bat rabies to humans, a reeducation of the public is necessary. There is no question that all bats serve a very important function in nature. There is also no question that of the many different species of bats, certain species are probably more affected than others. Unfortunately at the present time we do not know which species are most affected and thus most dangerous. Until that information is known, the general prevention rule is, **stay away from bats**. Do not invite them into your house nor your back yard.

Starting in 1996 all bats submitted to the State Public Health Laboratory for rabies testing will be speciated to learn which species are being affected in Missouri.

The distribution of rabies in Missouri continues to show activity in the extreme south central group of counties. See Figure 4. This originated in 1993 and continues to spread through the three lower tiers of counties bordering Arkansas. Infected animals other than skunks in that area were a fox, dog and horse. The only other cases of rabies in the state were the eight bats in the St. Louis area and a cat in Gasconade County.

The Department of Health has established a Laboratory Courier Service to transport laboratory specimens from across the state to the State Public Health Laboratory in Jefferson City. This courier service can be utilized to transport all types of specimens. For more information, contact Cinnamon Hannah at (573) 751-7239.

Tuberculosis 1995 Annual Report

Dan Ruggiero
Bureau of Tuberculosis Control

Reports from the Centers for Disease Control and Prevention (CDC) continue to show a decline in the number of tuberculosis cases reported nationwide. Data for 1995 indicates that there were over 22,812 new tuberculosis cases reported, for a case rate of 8.7 per 100,000 population. This constitutes a 6 percent decrease over the 24,361 cases reported in 1994, when the case rate was 9.4.

Missouri's tuberculosis cases reached an all time low in 1995 with 244 cases reported for a case rate of 4.6 per 100,000 population. This represents a 5.8 percent decrease over 1994 when 260 cases were reported and the first time since 1992 that a decline was noted. See Figure 1.

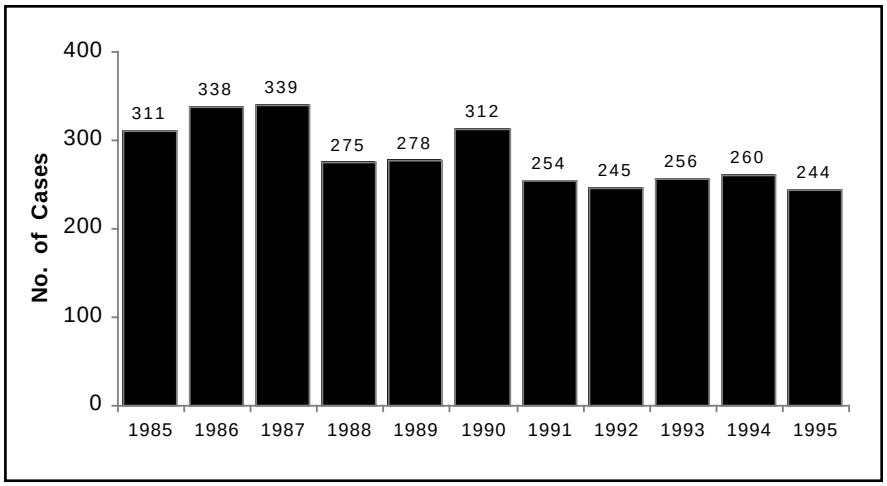

Figure 1. Tuberculois cases by year, Missouri, 1985–95.

As in previous years, male cases continued to outnumber female. In 1995, males accounted for 151 cases (61.9%), while females accounted for 93 (38.1%). This represents a downward trend from 1994 when 160 males (61.5%) and 100 females (38.5%) were reported as having tuberculosis disease.

In 1995, individuals with active tuberculosis disease ranged in age from less than 1 year to over 95. A decline was noted in all age groups except those 5–14 (with an increase of one case) and those over 65. A significant reduction was noted in tuberculosis cases under 5 years of age, which declined from 11 cases in 1994 to four cases in 1995. This represents the second year in a row that early childhood cases have dropped. Tuberculosis cases among the elderly, those 65 and over, continue to increase with 107 cases (43.9%) in 1995 compared with 93 (35.8%) in 1994. See Figure 2.

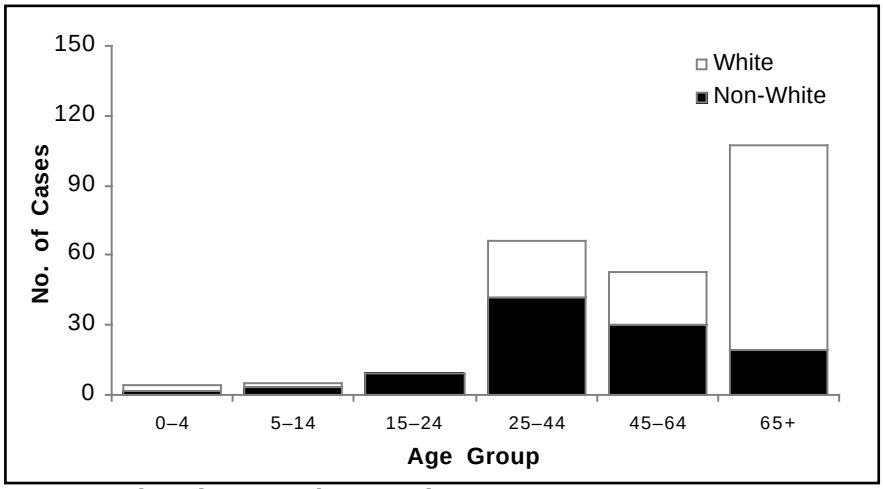

Figure 2. Tuberculosis cases by age and race, Missouri, 1995.

Disparities exist among the minority populations in Missouri, with tuberculosis case rates varying significantly among different racial and ethnic groups. In 1995, non-Hispanic whites accounted for 134 cases (55%), non-Hispanic blacks, 83 (34%), Asian/Pacific Islanders 22 (9%) and Hispanics 5 (2%). When compared with case rates per 100,000 populations, Asians had the highest case rate in 1995 at 41.3 compared to African Americans at 14.4, Hispanics at 7.2 and whites with the lowest case rate at 2.9. A significant drop in case rates was noted among Asians, from 61.8 in 1994 to 41.3 in 1995. Rates also declined among Hispanics, from 12 to 7.2, and whites, from 3.4 to 2.9. Tuberculosis case rates increased in African Americans, from 12 to 14.4. See Figure 3.

The geographic distribution of cases remained relatively stable among the metropolitan areas of Kansas City, St. Louis City, St. Louis County and Springfield-Greene County, which accounted for 127 (52%) of all reported cases, and the outstate areas with 117 (48%). Decreases were noted in three of the four metropolitan areas with St. Louis County dropping from 42 cases in 1994 to 35 in 1995, St. Louis City from 41 to 40 and Springfield/Greene County from 14 to 10. Kansas City experienced an increase from 39 cases in 1994 to 42 cases in 1995; this is the highest number of cases for any geographic area of the state, for a case rate of 9.7 per 100,000 population. This is more than twice the state rate of 4.6 and higher than the national rate of 8.7. See Figure 4.

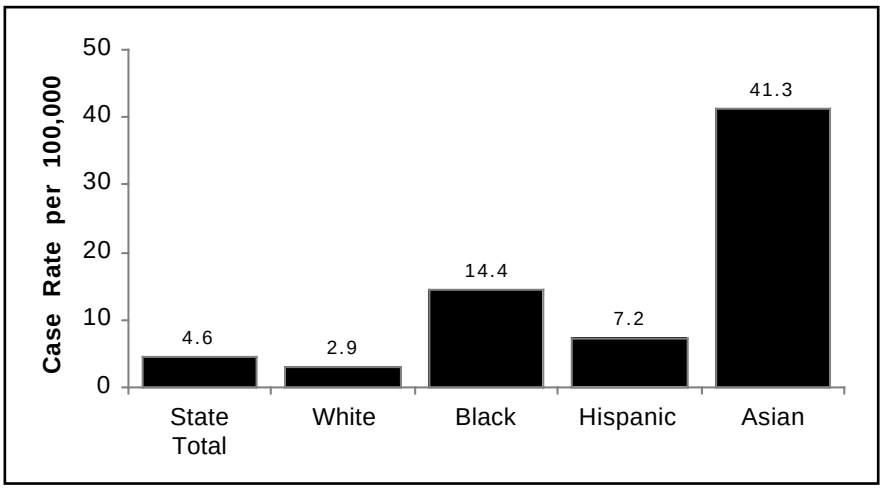

Figure 3. Tuberculosis case rates per 100,000 population by race and ethnicity, Missouri, 1995.

The outstate areas showed a 5.7 percent decrease in the number of cases from 124 in 1994 to 117 in 1995. Increases were noted in four of the six health districts, with the Northwestern District increasing from 15 to 18, Southeastern District from 39 to 41, Southwestern District from 18 to 26 and Eastern District from 8 to 9 cases. The greatest decrease was noted in the Central District, which decreased from 26 cases in 1994 to 12 in 1995. Decreases were also noted in state and federal correctional facilities, which decreased from 9 to 3, and the Northeastern District, which experienced a decrease of one case from the previous year for a total of 8 in 1995.

(continued on page 12)

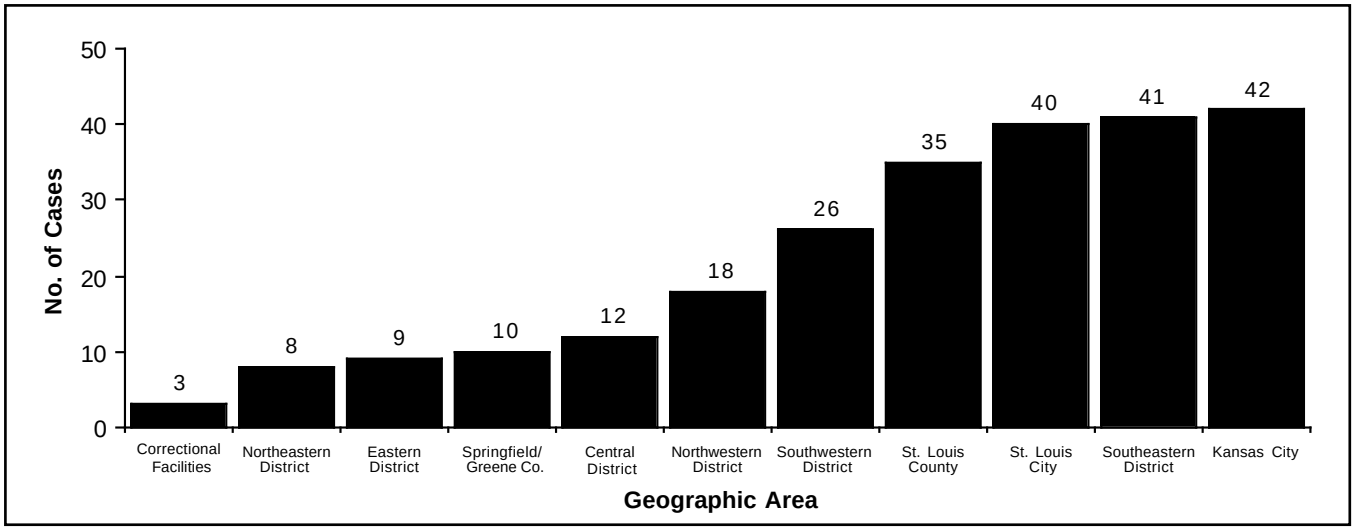

Figure 4. Tuberculosis cases by geographic area, Missouri, 1995.

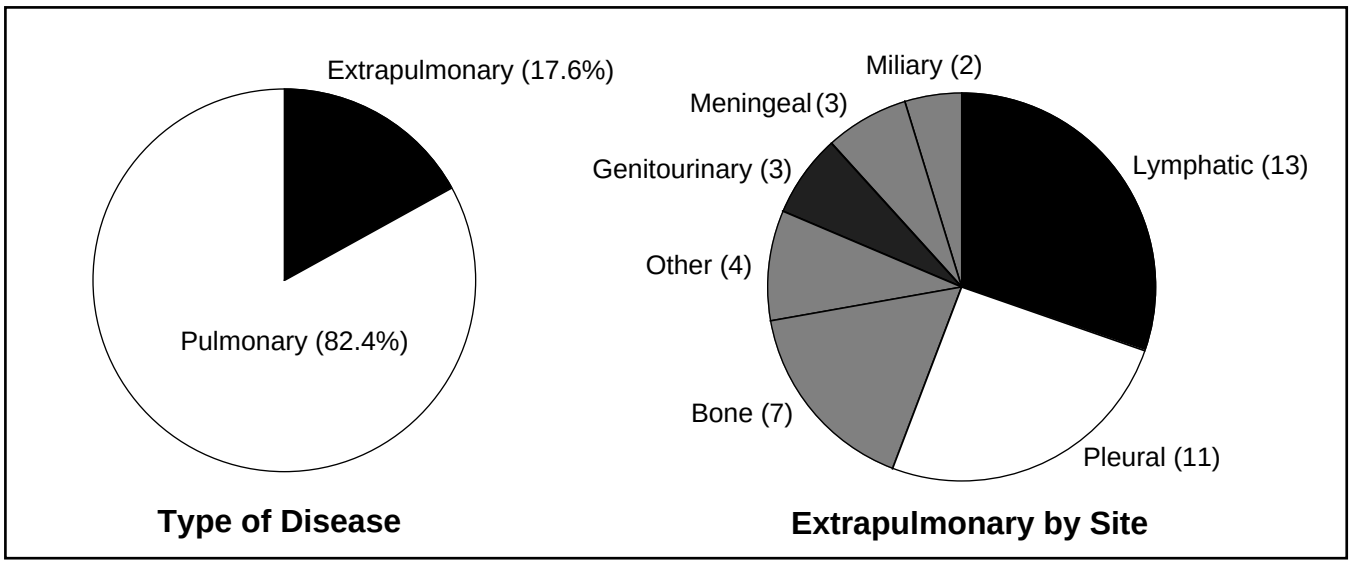

Figure 5. Tuberculosis cases by type of disease and site, Missouri, 1995.

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The greatest proportion of tuberculosis cases were pulmonary cases with 201 (82.4%), compared to 43 extrapulmonary (17.6%). There were 12 cases in which the diagnosis contained dual disease sites. Predominant sites for extra-pulmonary disease were lymphatic (13), pleural (11), bone (7), meningeal (3), genitourinary (3), miliary (2) and others (4). Bacteriologic confirmation was obtained in 82 percent of pulmonary and 84 percent of extrapulmonary cases. See Figure 5.

In 1995, drug susceptibility studies were performed on 194 (80%) of the 244 new tuberculosis cases reported. The number of drug-resistant cases has continued to increase each year. For several years the rate for Streptomycin (SM) had been around four percent, but in 1995 this rate increased dramatically to 12.8 percent. This increase was largely due to a change in laboratory procedures measuring SM resistance. In 1995, at the recommendation of CDC, the state tuberculosis laboratory decreased the critical concentration of SM from 6.0 μg/ml to 2.0 μg/ml. The immediate effect on SM statistics was to triple the apparent rate of resistance. See Figure 6.

Multi-drug resistant strains of tuberculosis (MTB) increased in 1995. Actual numbers increased from five patients in 1994 to 11 patients in 1995. However, ten of these strains were part of the increase of SM resistance described above. The number of Isoniazid/ Rifampin (INH-RIF) resistant strains remained unchanged at three. There were five patients with strains of MTB resistant to three or four anti-tuberculosis drugs. Two of these patients were from Kansas City, and one each from St. Louis County, St. Charles County and Taney County.

The proportion of cases resistant to Isoniazid (INH) has ranged from 7 to 19 percent during the past 12 years. In 1995, 9.0 percent of cases were INH resistant. Rifampin (RIF) resistance was without significant change in 1995, increasing slightly from 1.8 percent in 1994 to 1.9 percent in 1995. Four patients had strains of MTB resistant to RIF. The Pyrazinamide (PZA) resistance rate was 1.4 percent with three patients resistant to the drug compared to 1.8 percent and four patients in 1994. There was one patient with resistance to Ethambutol in Missouri in 1995.

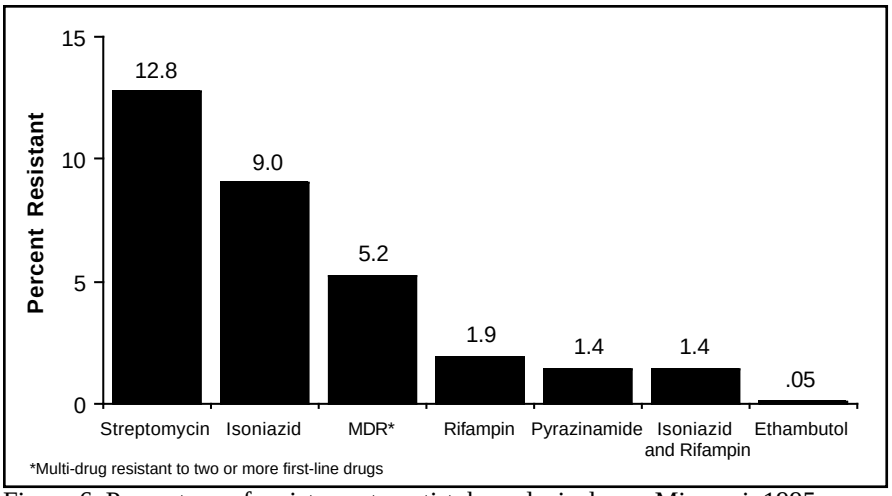

Figure 6. Percentage of resistance to anti-tuberculosis drugs, Missouri, 1995.

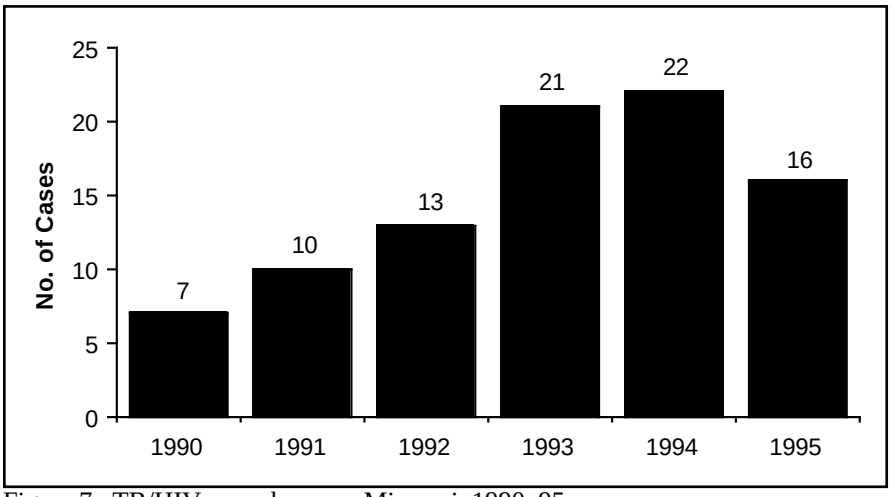

Figure 7. TB/HIV cases by year, Missouri, 1990–95.

From 1990–94, the number of TB/HIV cases increased. Between 1992 and 1994, the number of cases more than doubled from 10 to 21. This trend was reversed in 1995 when only 15 cases were identified as having dual disease. See Figure 7. As in previous years, most of the TB/HIV cases occurred in the large metropolitan areas, with St. Louis City reporting eight cases, Kansas City five cases and St. Louis County three cases. For the first time since 1987, there were no cases with dual disease reported from either federal or state correctional facilities, nor were there any cases reported from the outstate areas.

The number of tuberculosis cases reported in long-term residential facilities is of concern to the Bureau of Tuberculosis Control. Nursing homes and long-term care facilities accounted for 17 (7%) of all reported cases in Missouri in 1995. This represents a case rate of approximately 30 per 100,000 population, over six times the state rate and over three times the national rate.

(continued on page 35)

State Public Health Laboratory - 1995 Annual Report

Metabolic Disease Screening

Infants screened	**76,128**
Presumptive positives:	
PKU	12
Hypothyroidism	467
Galactosemia	28
Sickle Cell	20
Other hemoglobinopathies	1,394

Serology/Virology

HIV Serology	**85,198**
HIV antibody positive	879
Syphilis Serology	**31,744**
Sero-confirmed reactive	1,267
Hepatitis A Serology	**861**
Positive	213
Hepatitis B Serology	**10,291**
Positive	127
Measles, Mumps and Rubella (Diagnostic Serologies)	**9,092**
Measles (IgM positive)	7
Mumps (significant rise in titer)	0
Rubella (IgM positive)	1
Prenatal rubella screens	8,976
Nonreactive patients	843
Viral Isolation	**1,398**
Influenza isolates	110
Enterovirus isolates	7
Herpes isolates	413
Rabies	**1,884**
Positive specimens	27

Microbiology

Enterics	**2,533**
Salmonella	609
Shigella	635
Campylobacter jejuni	27
E. coli O157:H7	44
Parasitology	**2,494**
Ova/parasites found	879
Giardia lamblia	125
Ascaris lumbricoides	92
Hookworm	83
Trichuris trichura	33
Cryptosporidium	38
Reference Bacteriology	**1,412**
Francisella tularensis	8
Haemophilus influenzae	24
Neisseria meningitidis	60
Bordetella pertussis	81
DNA Probe for Chlamydia/Gonorrhoeae	**115,600**
N. gonorrhoeae	1,062
Chlamydia trachomatis	4,920

Environmental Testing

Chemistry	**21,223**
Blood lead samples	12,846
Total analyses	36,904
Blood lead ≥20 µg/dL	268
Environmental lead samples	429
Bacteriology—Water	
Private Samples	**12,130**
Coliform positive	3,108
Public Supplies	**58,246**
Coliform positive	2,251
E. coli/fecal coliform positive	292
Swimming Pools	**1,120**
Food/Dairy/Beverage	**4,189**
Excessive bacteria, coliform, yeast and mold	95

Tick-borne Disease Summary 1995

F.T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

Ticks flourish when warm weather returns. Along with ticks come the diseases which they carry. In Missouri, that includes tularemia, Rocky Mountain spotted fever (RMSF), ehrlichiosis and borreliosis. When addressing the risk of contracting these diseases and their severity, certain scientific facts should be kept in perspective.

Missouri with its natural climatic conditions of heat, moisture, woodlands and abundant wildlife is an ideal ecological setting for a wide variety of tick species. These include the Lone Star tick (*Amblyomma americanum*), the primary vector of tularemia in Missouri; the American dog tick (*Dermacentor variabilis*), the primary vector of RMSF in Missouri; and the brown dog tick (*Rhipicephalus sanguineus*), the vector of ehrlichiosis in dogs. While these ticks are thought to be the primary vectors of these diseases in Missouri, it does not mean that the Lone Star tick could not transmit RMSF or the American dog tick could not transmit tularemia. The primary tick vectors of ehrlichiosis and borreliosis in humans in Missouri are not known.

Humans are not the natural host of any tick. Any of the above ticks will bite man only as a matter of last resort or favorable opportunism. Since man is not the normal host, the *Amblyomma* and *Dermacentor* species must spend four to six hours acclimating to the human host before taking a blood meal and thus, possibly transmitting a disease. The *Ixodes* species must acclimate for 12 hours or more.

Of the millions of ticks, only a small percentage are likely to be infected. Most importantly in Missouri, ticks are normally around for only five to six months of the year. Despite the intricacies that are required for tick-borne diseases to occur, and the relative ease by which they can be prevented, tularemia, RMSF and ehrlichiosis normally affect 15–35 Missourians each year.

The Missouri Department of Health stresses the following information to assist its citizens to avoid contracting tick-borne diseases:

Tick Facts

- Ticks are bloodsucking arachnids capable of transmitting serious and sometimes fatal illnesses.
- Late spring and early summer are peak times for exposure to ticks.
- 94 percent of tick-borne disease cases occur between April 1 and September 30.
- Ticks transfer infection only after they have fed for several hours and are engorged.

Personal Protection

- Avoid known tick-infested areas.
- Apply repellents such as diethyltoluamide (DEET) and dimethylphthalate to clothing and exposed parts of the body. (These repellents are active ingredients in many popular insect repellents. Read and follow label directions.)
- Wear clothing that interferes with tick attachment (boots, full length and one-piece outer garments).
- Avoid sitting on grass and logs where exposure to ticks increases.
- Every four to six hours, inspect entire body, including scalp, arm pits and groin, to detect attached ticks.

Procedure for Tick Removal

- It is important to remove a tick as soon as possible after it is discovered.
- Proper tick removal is as important in reducing the risk of infection as timely removal.
- Exercise the same precautions when removing ticks from animals as when removing ticks from humans.
- It is suggested that the mechanical removal technique described below be used for all tick removal.

Steps for Tick Removal

1. Disinfect the site prior to tick removal.
2. Grasp the tick close to the skin using a blunt, curved forceps or tweezers. If fingers are used, shield them with tissue, paper towels or rubber gloves.
3. Pull upward with steady, even pressure. DO NOT twist or jerk as this may cause mouthparts to break off in the skin.
4. Take care not to squeeze, crush or puncture the body of the tick as its fluids may contain infective agents.
5. After removing the tick, thoroughly disinfect the bite site and wash hands with soap and water.
6. Safely dispose of the tick by placing it in a container of alcohol or flushing it down the toilet.
7. DO NOT handle ticks with bare hands as infectious agents may enter via mucous membranes or breaks in the skin.

Environmental Prevention

- Keep weeds and grass cut in yards and recreational areas.
- Clear brush along paths.
- Remove ticks from pets to minimize the tick population in areas near residences.

Tularemia

Epidemiology

During the last 15 years (1981–95), a total of 532 cases of tularemia have been reported in Missouri, or an average of 35 cases per year. See Figure 1. Either Missouri, Arkansas or Oklahoma has led the nation in the total number of cases reported each of these years. In 1995, Missouri had 25 cases reported.

Most cases in Missouri occur south of the Missouri River. Figure 2 shows the location of cases by county for 1995. The percentage of people contracting the disease from exposure to ticks or

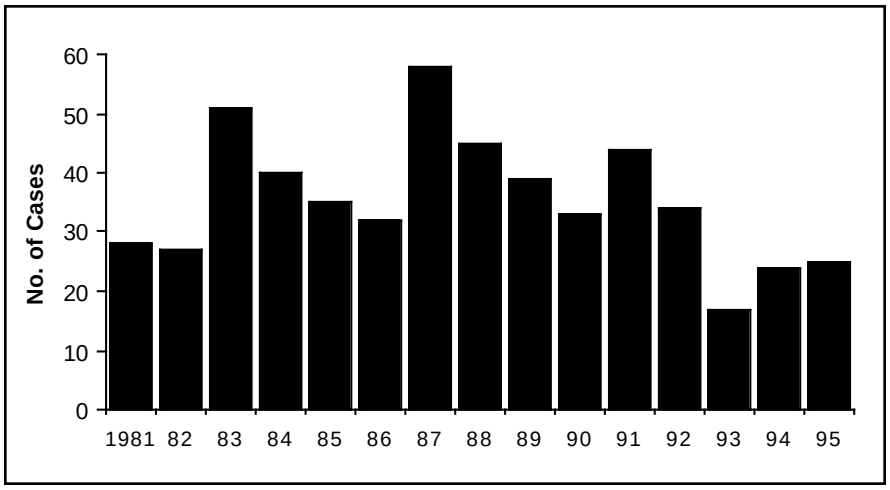

Figure 1. Tularemia cases by year, Missouri, 1981–95.

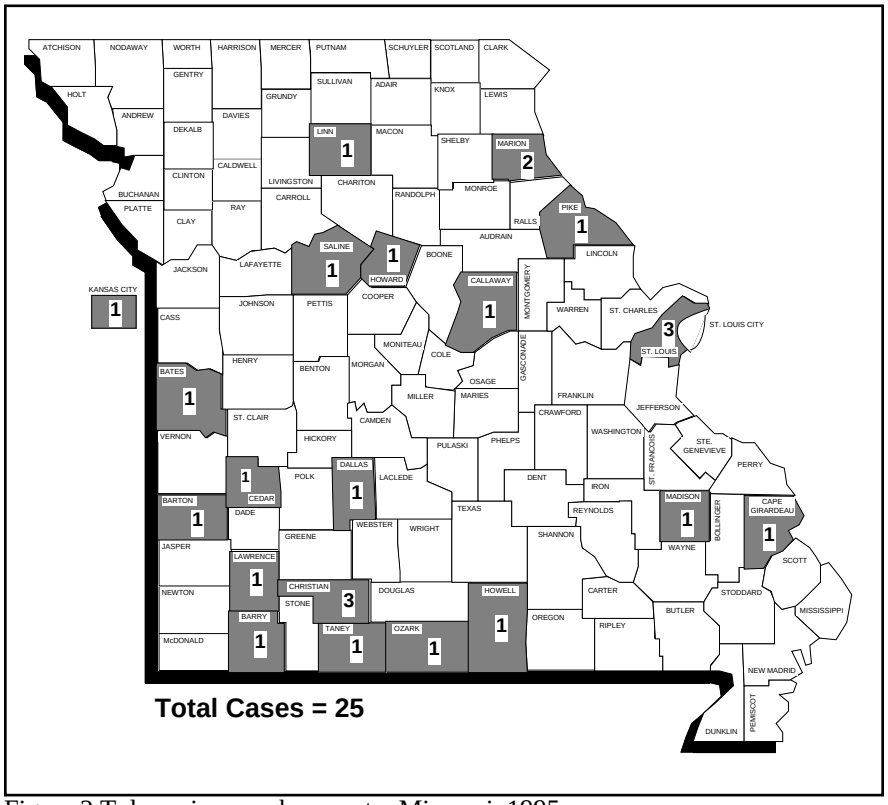

Figure 2.Tularemia cases by county, Missouri, 1995.

rabbits is about equal. The disease occurs more often in males than females, probably due to differences in exposure.

Transmission

Amblyomma americanum (Lone Star tick), is considered a direct transmitter of tularemia to man. This tick is found throughout the state. All stages of this tick (larva, nymph and adult) readily feed on humans as well as livestock, dogs, deer and birds.

Dermacentor variabilis (American dog tick) and *Haemaphysalis leporispalustris* (rabbit tick) are other ticks found in Missouri which transmit tularemia in animals. The American dog tick prefers dogs; however, it readily feeds on other mammals, but is not considered a threat to humans. The rabbit tick prefers to feed on birds during its nymphal stage, while the adult tick prefers rabbits, dogs, cats or horses as hosts.

Rodents and rabbits are the most susceptible animal species for tularemia and serve as the major source of infection for man. The disease also has been reported in sheep, goats, swine, cattle and horses.

Man is primarily infected from handling, skinning and cleaning infected wildlife; from eating under-cooked, infected meat; drinking contaminated water; and through insect bites. Critical at-risk groups include trappers, fur dealers, those working in fur-processing plants and hunters and their families. These simple precautions should be followed:

1. Avoid handling a wild rabbit that is too sick to run or that is caught by a dog.
2. Wear rubber gloves and thoroughly disinfect hands during and after dressing or skinning rabbits or aquatic fur animals.
3. Thoroughly cook wild game meat. The causative agent is destroyed within ten minutes at 140° F.
4. Avoid drinking untreated surface water.
5. Avoid bites of flies, mosquitoes and ticks through the use of insect repellents and protective clothing when working in endemic areas.

Illness in Humans

The *Francisella tularensis* organism, a small, gram-negative bacterium, is extremely virulent in man. Onset of the disease is sudden with the average incubation period being two to five days, with a range from one to ten days.

Tularemia should be included in the differential diagnosis of patients with a history of recent tick bite, dressing of wild game animals or being in outdoor areas in the summer months who present with fever, headache, malaise, prostration, ulcerated lesions or swollen lymph nodes. Since insect bites are often unnoticed and the disease may be contracted by drinking contaminated water, inhaling infected dust or eating under-cooked meat, tularemia should not be ruled out based on history alone.

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Six forms of the disease are described: ulceroglandular, glandular, oculoglandular, oropharyngeal, typhoidal and pneumonic. The clinical forms of disease are determined by portal of entry of the organism.

Acute and convalescent sera should be tested to demonstrate a fourfold rise in titer which is diagnostic. Titers usually take 10–14 days to develop and reach their peak in four to six weeks. Titers may remain elevated for years. If only convalescent serum is tested, a titer of 1:160 with compatible symptoms is considered to be diagnostic.

Rocky Mountain Spotted Fever

Epidemiology

During the last 15 years (1981–95), a total of 381 cases of RMSF have been reported in Missouri, or an average of 25 cases per year. See Figure 3. Missouri had 30 cases reported in 1995. Figure 4 shows the location of those cases by county for 1995. From 1988–95, Missouri has had five deaths due to RMSF. There has been an increased number of cases and deaths due to RMSF in dogs in recent years.

Transmission

The infectious agent of RMSF is *Rickettsia rickettsii*. Even though dogs, rodents and other small animals may harbor the rickettsiae, the principal vector and reservoir is the tick. The American dog tick (*Dermacentor variabilis*) is the primary vector of RMSF in Missouri. Ticks may become infected by feeding on infected mammals and harbor the rickettsia for life (about 18 months). Infected female ticks can transmit the disease transovarially to their offspring. Thus, while animal reservoirs play a role in the maintenance of the disease cycle, they are not necessary for the maintenance of the rickettsial organisms in nature.

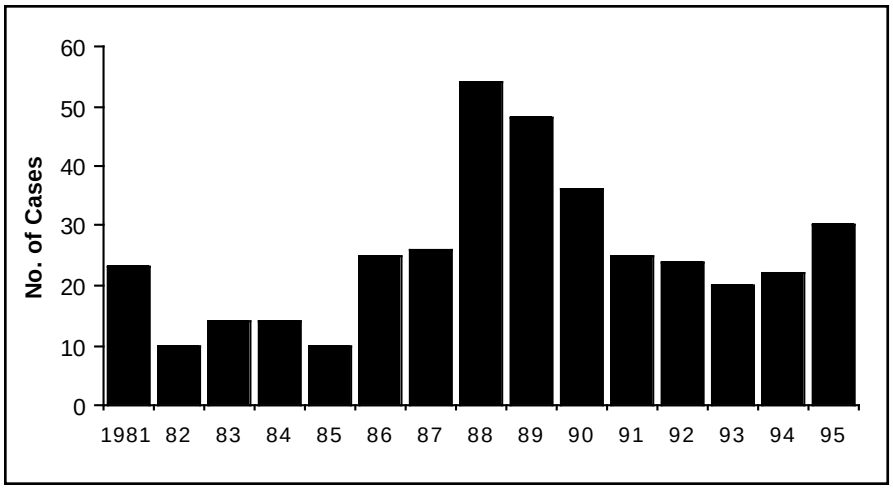

Figure 3. Rocky Mountain spotted fever cases by year, Missouri, 1981–95.

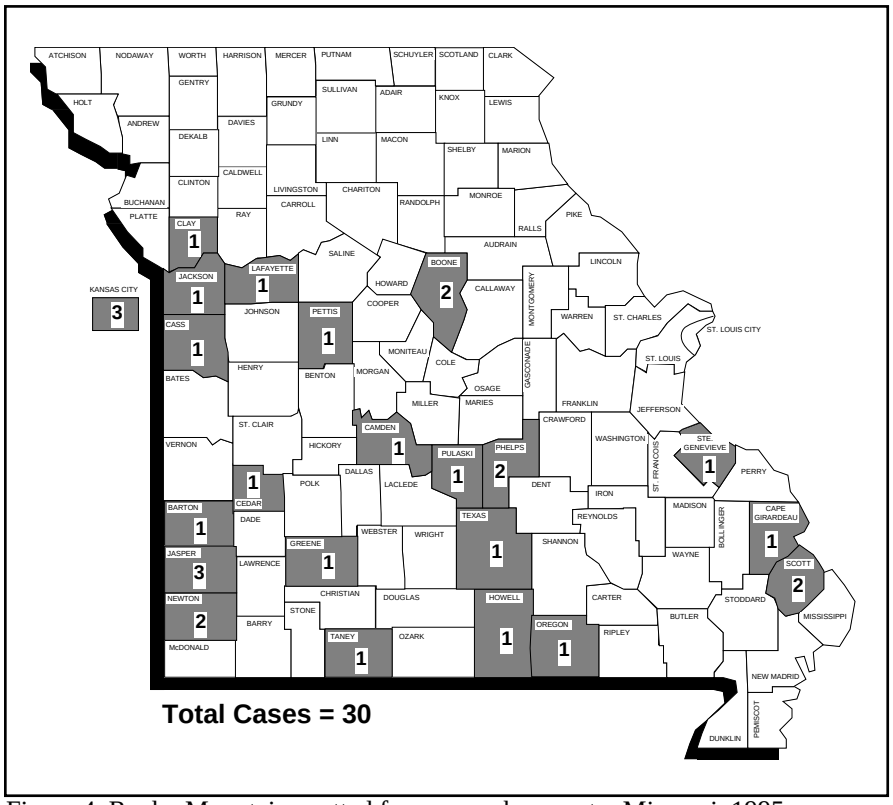

Figure 4. Rocky Mountain spotted fever cases by county, Missouri, 1995.

Illness in Humans

RMSF is characterized by sudden onset of symptoms including headache, conjunctivitis, peripheral and periorbital edema, chills, fever lasting two to three weeks, myalgia and a maculopapular rash, usually appearing on the second to sixth day. The rash is the most characteristic and helpful diagnostic sign. It usually appears first on the wrists and ankles and may include the palms and soles, spreading centripetally to the rest of the body. If treatment is delayed, petechiae and purpuric skin lesions are common. Health professionals are encouraged to investigate the possibility of tick exposure when diagnosing illnesses in patients presenting with these symptoms.

RMSF is best confirmed by a fourfold rise in titer of antibody to the spotted fever group antigen by indirect fluorescent antibody (IFA), complement fixation (CF), microagglutination (MA), in-

direct hemagglutination (IHA) or the latex agglutination (LA); a single convalescent titer of 1:64 or higher (IFA) in a clinically compatible case; by isolation of a spotted fever group rickettsiae; or by fluorescent antibody staining of biopsy or autopsy specimens. The Weil-Felix (also known as Proteus OX-19, OX-2, WF) test, which is not specific to RMSF, will give false positive elevation with non-rickettsial infections and should not be used as a diagnostic test.

Ehrlichiosis

Epidemiology

During the last eight years (1988–95), a total of 114 cases of ehrlichiosis have been reported in Missouri, or an average of 14 cases per year. See Figure 5. Missouri had 11 cases reported in 1995. Figure 6 shows the location of cases by county for 1995.

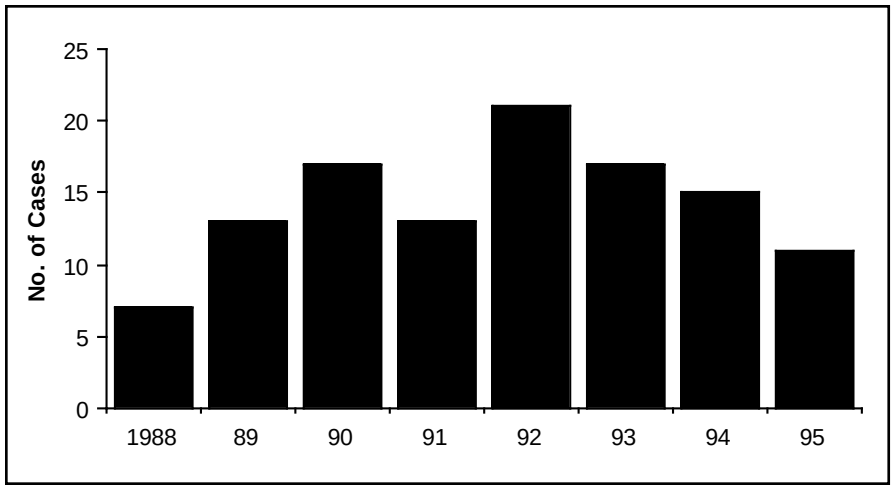

Figure 5. Ehrlichiosis cases by year, Missouri, 1988–95.

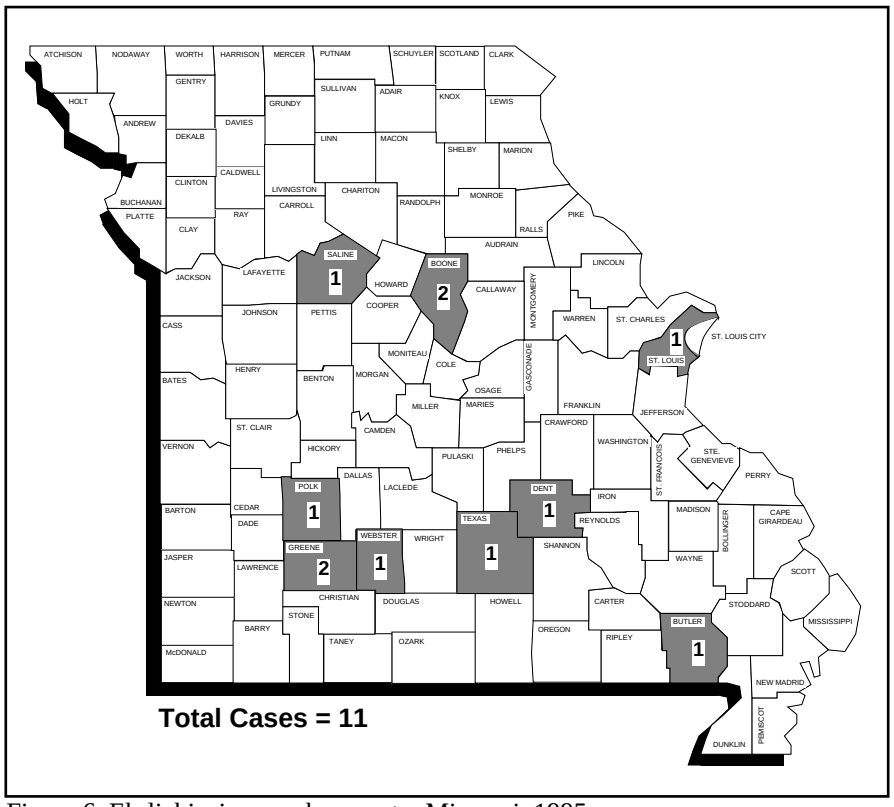

Figure 6. Ehrlichiosis cases by county, Missouri, 1995.

Transmission

Ehrlichia, members of the family *Rickettsiaceae*, are obligate, intracellular bacteria that parasitize mononuclear or polymorphonuclear leukocytes. In 1995, a granulocytic form of ehrlichiosis was discovered in Minnesota. The granulocytic form of ehrlichiosis has not been confirmed in Missouri.

The ability of *Ehrlichia* to infect and cause disease in animals is well-documented. In the United States, granulocytic and monocytic forms of *E. canis* infection have been reported among dogs. There is no evidence that human ehrlichiosis is transmitted directly from dogs to people.

Illness in Humans

Human ehrlichiosis resembles RMSF both clinically and epidemiologically.

- Eighty-three percent of the reported cases were suspected to have RMSF but developed no RMSF antibodies.
- Ehrlichiosis often presents with nonspecific symptoms similar to RMSF. Fever and headache are usually present, but rash is present in only 41 percent of ehrlichiosis cases compared to 88 percent of RMSF cases.
- More than 50 percent of cases have leukopenia, thrombocytopenia and mildly elevated liver function tests, specifically aspartate transaminase and alanine transaminase.
- Most patients have reported tick bites one to three weeks prior to onset of symptoms.

The diagnosis of ehrlichiosis is suggested by signs and symptoms compatible with ehrlichiosis and a history of tick bite. It is confirmed by indirect fluorescent antibody testing for antibodies against *E. chaffeensis*. Diagnosis currently requires a greater than or equal to fourfold increase/decrease in antibody titer to *E. chaffeensis* in acute- and convalescent-phase serum samples.

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Borreliosis

Epidemiology

The specific causal agents of borreliosis in Missouri have not been identified, but clinical illness has been seen which to many physicians appears to be a borrelial illness. Lyme disease was made reportable in Missouri in June 1989. The number of cases reported as Lyme disease increased dramatically after it was made reportable, then declined from 1992–95. See Figure 7. In 1995, there were 53 cases reported. Figure 8 shows the location of those cases by county.

It now appears that the Lyme-like disease being reported from exposure in Missouri is caused by *Borrelia* species other than *Borrelia burgdorferi*. Just as all the serotypes of *Salmonella* causing salmonellosis are recognized as causing the same or very similar disease, species of pathogenic *Borrelia* which may be discovered in Missouri could be referred to as the etiologic agents of "borreliosis."

Transmission

Borreliosis is a tick-borne, spirochetal disease transmitted to man from wild rodents, deer and other animals. There are numerous species of *Borrelia*, some are pathogenic and some are not. The tick most commonly reported as the vector for borreliosis in Missouri is *Amblyomma americanum* (the Lone Star tick). Other possible vectors include *Ixodes scapularis* (formerly *I. dammini*) and *Dermacenter variabilis* (the dog tick).

Illness in Man

Borreliosis is a difficult disease to diagnose. Patients may be unaware of tick bites and may not observe the characteristic erythema migrans lesion. In some cases, the lesion may not develop. Clinical signs included flu-like symptoms headache, myalgia, low-grade fever and malaise.

Despite the progress that has been made, borreliosis still presents a diagnostic challenge. The serologic response in late borreliosis (i.e., infection greater than one year) is not well documented or completely understood. The effect of antibiotic therapy on the immunologic response is not completely known. Standardization of immunoblot reagents will take time. Meanwhile, new tests using new technologies (PCR, genetic probes, etc.) are constantly being developed.

The Department of Health recommends two-step testing using enzyme immunoassay or immunofluorescent assay initially and confirming positives and equivocal results with the Western Blot test. For samples drawn in the first four weeks after onset of symptoms, the Western Blot should test for both IgM and IgG. Most patients will seroconvert during this period. Patients who test negative should have testing repeated with paired acute and convalescent specimens. Western Blot for sera drawn greater than four weeks after onset of symptoms should only be tested for IgG.

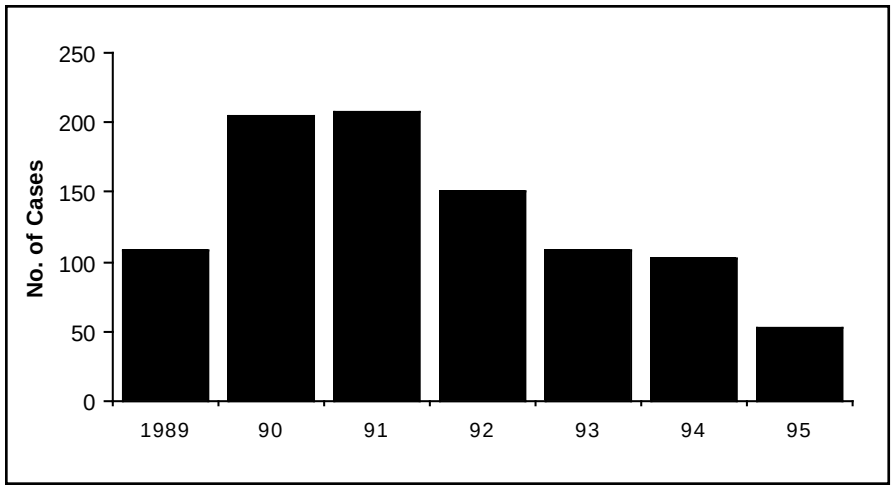


Figure 7. Borreliosis cases by year, Missouri, 1989–95.

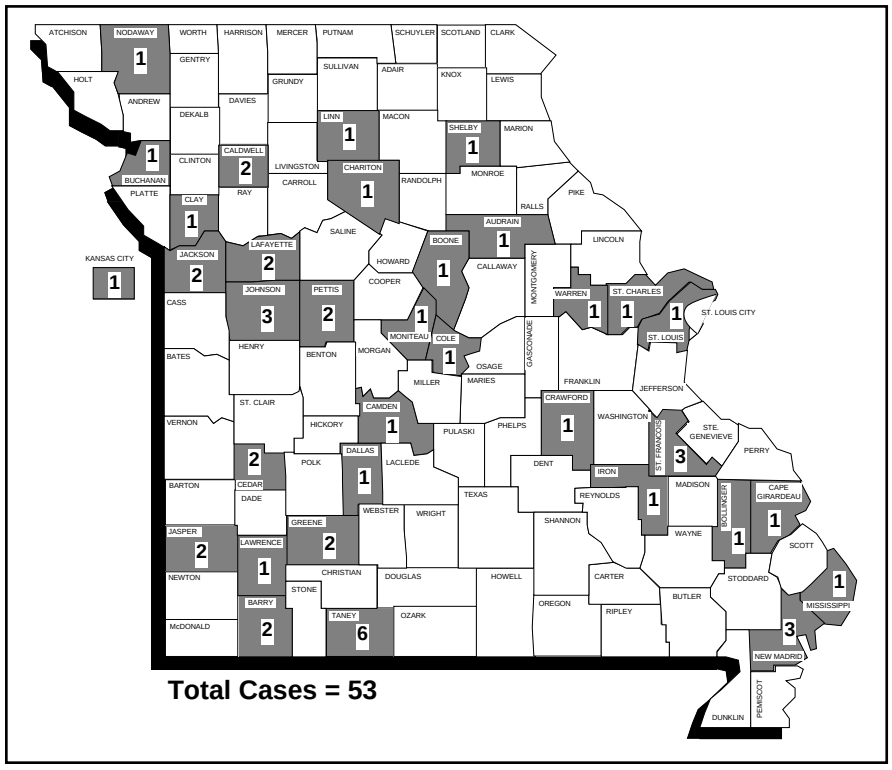
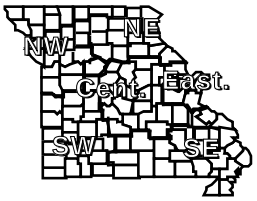


Figure 8. Borreliosis cases by county, Missouri, 1995.



Missouri Department of Health
Division of Environmental Health and Epidemiology
QUARTERLY REPORT

Reporting Period *
January - March, 1996

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	3 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1996	1995	FOR 1996	FOR 1995	5 YR MEDIAN
Vaccine Preventable Dis.																
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	2	0	2	4
Hib Other Invasive	2	0	0	0	1	0		0	0	1	0	4	6	4	6	13
Influenza	1	14	13	15	0	7		4	1	27	5	87	256	87	256	163
Measles	0	0	2	0	0	0		0	0	0	0	2	1	2	1	0
Mumps	0	0	0	0	0	0		0	0	0	0	0	7	0	7	10
Pertussis	0	1	1	0	2	0		0	0	1	0	5	4	5	4	8
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0		0	0	0	0	0	1	0	1	0
Viral Hepatitis																
A	55	9	36	11	63	5		34	3	4	5	225	196	225	196	196
B	6	0	2	1	10	1		6	20	5	5	56	114	56	114	124
Non A - Non B	2	2	0	1	2	0		0	0	0	1	8	6	8	6	8
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	0	2
Meningitis																
Aseptic	4	1	2	2	3	0		0	1	2	7	22	18	22	18	24
Meningococcal	4	0	3	0	2	3		2	3	3	0	20	10	20	10	11
Enteric Infections																
Campylobacter	2	0	9	6	2	6		1	7	5	6	44	86	44	86	86
Salmonella	14	3	11	16	9	7		5	1	14	6	86	89	86	89	82
Shigella	36	9	22	25	4	11		3	1	17	0	128	195	128	195	122
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	1	0	1	0
Parasitic Infections																
Amebiasis	0	1	0	0	0	0		2	2	1	0	6	3	6	3	7
Giardiasis	21	6	30	16	14	12		5	10	17	8	139	119	139	119	123
Sexually Transmitted Dis.																
AIDS	16	3	19	14	10	7	4	46	24	19	8	170	155	170	155	173
Gonorrhea	80	40	100	101	65	16		684	711	420		2217	3154	2217	3154	3154
Prim. & Sec. syphilis	0	0	2	1	2	0		2	59	27		93	173	93	173	243
Tuberculosis																
Extrapulmonary	0	0	1	0	0	0	0	2	0	1	0	4	10	4	10	6
Pulmonary	2	2	3	6	2	1	0	6	0	6	1	29	41	29	41	34
Zoonotic																
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rabies (Animal)	0	0	0	6	1	0		0	0	0	1	8	10	8	10	3
Rocky Mtn. Sp. Fever	1	0	0	0	0	0		0	0	0	0	1	1	1	1	0
Tularemia	0	0	0	0	0	0		0	0	0	0	0	1	0	1	1

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 5
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease
Legionellosis - 1
Leptospirosis
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 1
Trichinosis

Outbreaks

Foodborne - 1
Waterborne
Nosocomial - 3
Scabies - 5
Other
Giardia - 1
Hepatitis A - 1
Shigella - 2
Influenza - 1
AGI - 7

*Reporting Period Beginning December 31, 1995, Ending March 30, 1996.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

Missouri Morbidity and Mortality Reports of Selected Communicable Diseases - 15 Year Report

	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981
AIDS	769	727	1,644	657	651	596	478	401	240	91	52	28	6	1	-
Amebiasis	18	38	54	23	25	26	19	30	27	26	28	44	45	11	28
Brucellosis	0	0	0	0	3	1	2	4	14	4	12	7	4	4	4
Campylobacter	601	631	616	614	602	547	473	441	260	281	304	260	166	115	78
Chickenpox	8,840	10,147	9,609	10,009	7,678	10,591	9,086	11,350	8,595	5,093	2,474	2,565	408	637	880
Chlamydia	12,084	12,244	11,625	11,907	10,643	11,151	8,151	6,239	2,944	1,532	412	9	-	-	-
Encephalitis, Inf.	11	14	26	16	22	12	6	8	11	13	12	11	28	16	10
Giardiasis	761	774	770	739	790	878	859	654	690	516	458	462	216	235	113
Gonorrhea	11,302	12,555	13,147	14,887	17,450	20,012	21,053	17,241	16,491	19,029	20,023	20,042	20,750	21,269	22,249
Haemophilus influenzae type b															
Meningitis	10	7	12	22	42	88	106	138	131	172	108	104	86	66	-
Other Invasive	18	44	123	59	39	57	-	-	-	-	-	-	-	-	-
Hepatitis A	1,338	619	1,443	1,500	653	619	810	897	560	126	98	138	123	204	282
Hepatitis B	437	538	585	535	549	633	704	639	460	420	359	297	365	297	307
Non A, Non B	23	32	25	27	31	42	53	50	46	39	42	18	33	24	-
Unspecified	1	1	19	9	15	19	13	21	21	15	24	46	87	95	214
Influenza (confirmed)	491	163	272	111	462	220	293	148	69	78	61	39	140	153	225
Lyme Disease	53	102	108	150	207	205	108	-	-	-	-	-	-	-	-
Malaria	9	14	9	12	9	13	13	6	8	12	5	8	4	10	4
Meningitis, Asep.	269	175	275	272	277	246	223	124	163	172	156	95	277	156	178
Meningitis, Mening.	54	43	34	32	37	31	21	33	35	40	46	53	55	40	45
Mumps	25	44	46	39	40	62	87	68	38	23	18	11	21	13	40
Pertussis	63	45	144	120	83	116	141	25	46	32	35	23	24	17	24
Polio, all forms	0	0	0	0	0	0	0	1	0	0	1	0	2	0	1
Rabies, Animal	30	27	35	37	28	30	62	36	59	75	59	70	96	123	243
RMSF	30	22	20	24	25	36	48	54	26	25	10	14	14	10	23
Rubella	0	2	1	1	5	3	4	0	0	1	7	0	0	38	2
Rubeola	2	161	1	0	1	103	671	65	190	32	5	6	1	2	1
Salmonellosis	577	642	529	426	616	723	676	772	660	728	690	617	602	571	700
Shigellosis	1,138	654	674	742	259	284	411	607	471	89	143	244	264	67	268
Syphilis, Total	1,271	1,985	2,499	1,940	926	598	388	473	328	494	578	712	801	1,069	1,397
Primary & Secondary	584	987	1,354	1,167	572	272	162	154	90	110	133	186	145	296	394
Tetanus	3	1	1	1	1	0	4	1	1	2	3	6	1	1	1
Tuberculosis	244	260	256	245	254	312	278	275	339	338	311	354	399	390	432
Tularemia	25	24	17	34	44	33	39	45	58	32	35	40	51	27	28
Typhoid Fever	3	1	2	3	2	4	2	3	7	6	6	6	10	4	9
Yersinia enterocolitica	21	40	26	37	48	32	36	30	10	6	2	3	1	-	-

Update: Provisional Public Health Service Recommendations For Chemoprophylaxis After Occupational Exposure to HIV

Reprinted from the Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report (MMWR), June 7, 1996, Volume 45, No. 22.

Although preventing blood exposures is the primary means of preventing occupationally acquired human immunodeficiency virus (HIV) infection, appropriate postexposure management is an important element of workplace safety.[1] Information suggesting that zidovudine (ZDV) postexposure prophylaxis (PEP) may reduce the risk for HIV transmission after occupational exposure to HIV-infected blood[2] prompted a Public Health Service (PHS) interagency working group*, with expert consultation†, to update a previous PHS statement on management of occupational exposure to HIV with the following findings and recommendations on PEP.[1§]

Background

Although failures of ZDV PEP have occurred[3], ZDV PEP was associated with a decrease of approximately 79% in the risk for HIV seroconversion after percutaneous exposure to HIV-infected blood in a case-control study among healthcare workers.[2] In a prospective trial in which ZDV was administered to HIV-infected pregnant women and their infants, a direct effect of ZDV prophylaxis on the fetus and/or infant may have contributed to the observed 67% reduction in perinatal HIV transmission[4]; the protective effect of ZDV was only partly explained by reduction of the HIV titer in maternal blood.[5] PEP also prevented or ameliorated retroviral infection in some studies in animals.[6,7]

The average risk for HIV infection from all types of reported percutaneous exposures to HIV-infected blood is 0.3%.[3] In the case-control study[2], risk was increased for exposures involving:

1. a deep injury to the health-care worker,
2. visible blood on the device causing the injury,
3. a device previously placed in the source-patient's vein or artery (e.g., a needle used for phlebotomy), or
4. a source-patient who died as a result of acquired immunodeficiency syndrome (AIDS) within 60 days postexposure (and therefore was presumed to have a high titer of HIV).[2]

Identification of these risk factors in the case-control study suggests that the risk for HIV infection exceeds 0.3% for percutaneous exposures involving a larger blood volume and/or higher HIV titer in blood. The risks after mucous membrane and skin exposures to HIV-infected blood (on average, approximately 0.1% and <0.1%, respectively[7]) probably also depend on volume of blood and titer of HIV. The risk is probably higher for skin contact that is prolonged, involves an area that is extensive or in which skin integrity is visibly compromised, and/or involves a higher HIV titer.

Although information about the potency and toxicity of antiretroviral drugs is available from studies of HIV-infected patients, it is uncertain to what extent this information can be applied to uninfected persons receiving PEP. In HIV-infected patients, combination therapy with the nucleosides ZDV and lamivudine (3TC) has greater antiretroviral activity than ZDV alone and is active against many ZDV-resistant HIV strains without significantly increased toxicity.[8] Adding a protease inhibitor provides even greater increases in antiretroviral activity; among protease inhibitors, indinavir (IDV) is more potent than saquinavir at currently recommended doses and appears to have fewer drug interactions and short-term adverse effects than ritonavir.[8] Few data exist to assess possible long-term (i.e., delayed) toxicity resulting from use of these drugs in persons not infected with HIV.

In currently recommended doses, ZDV PEP usually is tolerated well by healthcare workers; short-term toxicity associated with higher doses primarily includes gastrointestinal symptoms, fatigue, and headache.[3,7] The toxicity of other antiretroviral drugs in persons not infected with HIV has not been well characterized. In HIV-infected adults, 3TC can cause gastrointestinal symptoms and, in rare instances, pancreatitis. IDV toxicity includes gastrointestinal symptoms and, usually after prolonged use, mild hyperbilirubinemia (10%) and kidney stones (4%); the latter may be limited by drinking at least 48 oz (1.5 L) of fluid per 24-hour period.[8] During the first 4 weeks of IDV therapy, the reported incidence of kidney stones was 0.8% (Merck Research Laboratories, unpublished data, 1996). As stated in the package insert, the concurrent use of IDV and certain other drugs, including some nonsedating antihistamines, is contraindicated. Based on limited data, ZDV use in the second and third trimesters of

(continued on page 22)

* The interagency working group comprised representatives of CDC, the Food and Drug Administration (FDA), the Health Resources and Services Administration, and the National Institutes of Health. Information included in these recommendations may not represent FDA approval or approved labeling for the particular products or indications in question. Specifically, the terms "safe" and "effective" may not be synonymous with the FDA-defined legal standards for product approval.

† CDC and the National Foundation for Infectious Diseases cosponsored a workshop, HIV Post-Exposure Management for Health Care Workers, on March 4–5, 1996; proceedings of the workshop will be published in the *American Journal of Medicine*.

§ Single copies of this report will be available free until June 7, 1997, from the CDC National AIDS Clearinghouse, P.O. Box 6003, Rockville, MD 20849-6003; telephone (800) 458-5231 or (301) 217-0023.

Table 1. Provisional Public Health Service Recommendations for Chemoprophylaxis After Occupational Exposure to HIV, by Type of Exposure and Source Material—1996.

Type of Exposure	Source Material*	Antiretroviral Prophylaxis†	Antiretroviral Regimen§
Percutaneous	Blood¶		
	Highest Risk	Recommend	ZDV plus 3TC plus IDV
	Increased Risk	Recommend	ZDV plus 3TC, ± IDV**
	No increased Risk	Offer	ZDV plus 3TC
	Fluid containing visible blood, other potentially infectious fluid††, or tissue	Offer	ZDV plus 3TC
	Other body fluid (e.g., urine)	Not offer	
Mucous membrane	Blood	Offer	ZDV plus 3TC, ± IDV**
	Fluid containing visible blood, other potentially infectious fluid††, or tissue	Offer	ZDV, ± 3TC
	Other body fluid (e.g., urine)	Not offer	
Skin, increased risk§§	Blood	Offer	ZDV plus 3TC, ± IDV**
	Fluid containing visible blood, other potentially infectious fluid††, or tissue	Offer	ZDV, ± 3TC
	Other body fluid (e.g., urine)	Not offer	

* Any exposure to concentrated HIV (e.g., in a research laboratory or production facility) is treated as percutaneous exposure to blood with highest risk.

† *Recommend*—Postexposure prophylaxis (PEP) should be recommended to the exposed worker with counseling (see text). *Offer*—PEP should be offered to the exposed worker with counseling (see text). *Not offer*—PEP should not be offered because these are not occupational exposures to HIV.[1]

§ Regimens: zidovudine (ZDV), 200 mg three times a day; lamivudine (3TC), 150 mg two times a day; indinavir (IDV), 800 mg three times a day (if IDV is not available, saquinavir may be used, 600 mg three times a day). Prophylaxis is given for 4 weeks. For full prescribing information, see package inserts.

¶ *Highest risk*—BOTH larger volume of blood (e.g., deep injury with large diameter hollow needle previously in source patient's vein or artery, especially involving an injection of source-patient's blood) AND blood containing a high titer of HIV (e.g., source with acute retroviral illness or end-stage AIDS; viral load measurement may be considered, but its use in relation to PEP has not been evaluated). *Increased risk*—EITHER exposure to larger volume of blood OR blood with a high titer of HIV. *No increased risk*—NEITHER exposure to larger volume of blood NOR blood with a high titer of HIV (e.g., solid suture needle injury from source patient with asymptomatic HIV infection).

** Possible toxicity of additional drug may not be warranted (see text).

†† Includes semen; vaginal secretions; cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids.

§§ For skin, risk is increased for exposures involving a high titer of HIV, prolonged contact, an extensive area, or an area in which skin integrity is visibly compromised. For skin exposures without increased risk, the risk for drug toxicity outweighs the benefit of PEP.

(continued from page 21)

pregnancy and early infancy was not associated with serious adverse effects in mothers or infants[4,9]; data are limited regarding the safety of ZDV during the first trimester of pregnancy or of other antiretroviral agents during pregnancy. Although 3TC has been associated with pancreatitis in HIV-infected children[8], whether 3TC causes fetal toxicity is unknown.

Recommendations

The following recommendations are provisional because they are based on limited data regarding efficacy and toxicity of PEP and risk for HIV infection after different types of exposure. Because most occupational exposures to HIV do not result in infection transmission, potential toxicity must be carefully considered when prescribing PEP. When possible, these recommendations should be implemented in consultation with persons having expertise in antiretroviral therapy and HIV transmission. Changes in drug regimens may be appropriate, based on factors such as the probable antiretroviral drug resistance profile of HIV from the source patient; local availability of drugs; and medical conditions, concurrent drug therapy, and drug toxicity in the exposed worker. These recommendations were not developed to address nonoccupational (e.g., sexual) exposures.

1. Chemoprophylaxis should be recommended to exposed workers after occupational exposures associated with the highest risk for HIV transmission. For exposures with a lower, but non-negligible risk, PEP should be offered, balancing the lower risk against the use of drugs having uncertain efficacy and toxicity. For exposures with negligible risk, PEP is not justified (Table 1). Exposed workers should be informed that a) knowledge about the efficacy and toxicity of PEP is limited; b) for agents other

than ZDV, data are limited regarding toxicity in persons without HIV infection or who are pregnant; and c) any or all drugs for PEP may be declined by the exposed worker.

2. At present, ZDV should be considered for all PEP regimens because ZDV is the only agent for which data support the efficacy of PEP in the clinical setting. 3TC should usually be added to ZDV for increased antiretroviral activity and activity against many ZDV-resistant strains. A protease inhibitor (preferably IDV because of the characteristics summarized in this report) should be added for exposures with the highest risk for HIV transmission (Table 1). Adding a protease inhibitor also may be considered for lower risk exposures if ZDV-resistant strains are likely, although it is uncertain whether the potential additional toxicity of a third drug is justified for lower risk exposures. For HIV strains resistant to both ZDV and 3TC or resistant to a protease inhibitor, or if these drugs are contraindicated or poorly tolerated, the optimal PEP regimen is uncertain; expert consultation is advised[¶].

3. PEP should be initiated promptly, preferably within 1–2 hours post-exposure. Although animal studies suggest that PEP probably is not effective when started later than 24–36 hours postexposure[6,7], the interval after which there is no benefit from PEP for humans is undefined. Initiating therapy after a longer interval (e.g., 1–2 weeks) may be considered for the highest risk exposures; even if infection is not prevented, early treatment of acute HIV infection may be beneficial.[10] The optimal duration of PEP is unknown; because 4 weeks of ZDV appeared protective[2], PEP should probably be administered for 4 weeks, if tolerated.

4. If the source patient or the patient's HIV status is unknown, initiating PEP should be decided on a case-by-case basis, based on the exposure risk and likelihood of HIV infection in known or possible source patients. If additional information becomes available, decisions about PEP can be modified.

5. Workers with occupational exposures to HIV should receive follow-up counseling and medical evaluation, including HIV-antibody tests at baseline and periodically for at least 6 months postexposure (e.g., 6 weeks, 12 weeks, and 6 months), and should observe precautions to prevent possible secondary transmission.[1] If PEP is used, drug-toxicity monitoring should include a complete blood count and renal and hepatic chemical function tests at baseline and 2 weeks after starting PEP. If subjective or objective toxicity is noted, dose reduction or drug substitution should be considered with expert consultation, and further diagnostic studies may be indicated. Health-care workers who become infected with HIV should receive appropriate medical care.

6. Beginning July 15, 1996, health-care providers in the United States are encouraged to enroll all workers who receive PEP in an anonymous registry being developed by CDC, Glaxo Wellcome Inc., and Merck & Co., Inc., to assess toxicity (telephone [888] 737-4448 [(888) PEP-4HIV]). Unusual or severe toxicity from antiretroviral drugs should be reported to the manufacturer and/or the Food and Drug Administration (telephone [800] 332-1088). Updated information about HIV PEP will be available beginning in early 1997 from the Internet at CDC's home page (http://www.cdc.gov); CDC's fax information service, telephone (404) 332-4565 (Hospital Infections Program directory); the National AIDS Clearinghouse, telephone (800) 458-5231; and the HIV/AIDS Treatment Information Service, telephone (800) 448-0440.

[¶] An HIV strain is more likely to be resistant to a specific antiretroviral agent if it is derived from a patient who has been exposed to the agent for a prolonged period of time (e.g., 6–12 months or longer). In general, resistance develops more readily in persons with more advanced HIV infection (e.g., CD4+ T-lymphocyte count of <200 cells/mm^3), reflecting the increasing rate of viral replication during later stages of the illness.

Reported by: Center for Drug Evaluation and Research, Food and Drug Administration. AIDS Program Office, Health Resources and Svcs Administration. National Institute of Allergy and Infectious Diseases, Warren H. Magnuson Clinical Center, National Institutes of Health. National Center for HIV, STD, and TB Prevention (proposed); National Institute for Occupational Safety and Health; and National Center for Infectious Diseases, CDC.

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Sexually Transmitted Diseases and HIV - 1996

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The mission of the Bureau of STD/HIV Prevention is to prevent the transmission of sexually transmitted diseases (STDs) and human immunodeficiency virus (HIV) infection in Missouri through surveillance, intervention and education. The bureau strives to meet its mission through dynamic partnerships with local health departments, community-based organizations, governmental agencies, private businesses and community planning processes.

1995 was a successful year in STD and HIV prevention. Notable milestones:

- ✔ Reduction of Sexually Transmitted Diseases in Missouri
  - 41% reduction in reported cases of primary and secondary syphilis compared to 1994
  - 36% reduction in reported cases of congenital syphilis compared to 1994
  - 28% reduction in reported cases of early latent syphilis compared to 1994
  - 10% reduction in reported cases of gonorrhea compared to 1994
- ✔ Development by the United States Public Health Service of recommendations for HIV counseling and voluntary testing of pregnant women to decrease the risk of perinatal HIV transmission
- ✔ Development of new technologies for HIV specimen collection.

Early Syphilis

Primary and Secondary (P&S) and Early Latent (less than one year's duration)

The reported incidence of early syphilis in Missouri has decreased during the past two years. See Figure 1. From 1994 to 1995, reported cases of P&S syphilis decreased by 41 percent, from 988 cases to 584 cases. Early latent cases decreased by 28 percent, from 707 cases in 1994 to 506 cases in 1995. St. Louis City reported 60 percent of the state's early syphilis cases in 1995, with 361 P&S cases and 289 early latent cases; however, this total of 650 early syphilis cases was 38 percent lower than the 1,042 cases reported from St. Louis City in 1994. St. Louis County reported a 21 percent decrease in early syphilis cases, from 377 cases in 1994 to 299 cases in 1995. Kansas City reported a 65 percent decrease, from 151 early syphilis cases in 1994 to 53 cases in 1995. In Outstate Missouri, there were 125 early syphilis cases in 1994 compared to 88 cases in 1995, a decrease of 30 percent.

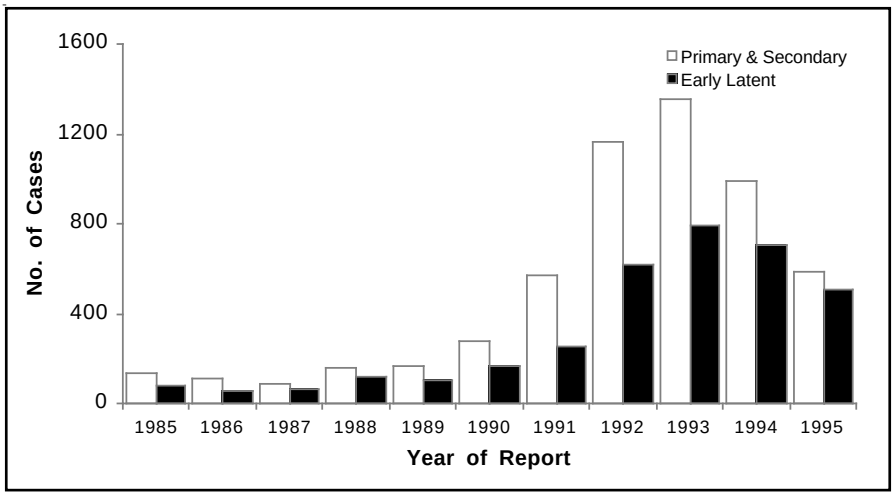

Figure 1. Reported early syphilis cases by year, Missouri, 1985–95.

AIDS is the leading cause of death for Americans 25–44 years of age; and the third leading cause of death for Missourians in this age group. In 1994, Missouri ranked sixth among the fifty states in the rate of reported P&S syphilis cases, and tenth in the rate of reported gonorrhea cases. In 1994, St. Louis had the highest rates of P&S syphilis and gonorrhea of any United States city with greater than 200,000 population.

While the decrease to 584 P&S syphilis cases reported in 1995 is significant, it still represents a 549 percent increase from the 30-year low of 90 cases reported in 1987. See Figure 1. Concerted disease intervention and treatment programs have successfully reduced STDs such as syphilis in recent years, but significant efforts remain necessary, as Missouri, in 1994, was sixth among the fifty states in the rate of reported P&S syphilis cases, and tenth in the rate of reported gonorrhea cases. In 1994, St. Louis had the highest rates of P&S syphilis and gonorrhea of any United States city with greater than 200,000 population. The P&S syphilis rate of 11.4 per 100,000 population in Missouri during 1995 is significantly higher than the corresponding nationwide rate of 5.9 per 100,000 population. Additionally, certain groups within the population, such as urban African Americans and youth, are experiencing STDs at significantly increased proportions in comparison with other population groups.

A large proportion of syphilis cases in all areas of the state continue to appear related to crack-cocaine use, as persons exchange sex for drugs or money. The

link with socioeconomic status is clearly noted, and increased efforts in community outreach and treatment are necessary.

Congenital Syphilis

Reported cases of congenital syphilis in Missouri decreased 36 percent, from 72 cases in 1994 to 46 cases in 1995. See Figure 2. Approximately 80 percent of the state's congenital syphilis cases were reported from the St. Louis metropolitan area, with St. Louis City reporting 26 cases (57 percent of all Missouri cases) and St. Louis County reporting 11 cases (24 percent of all Missouri cases).

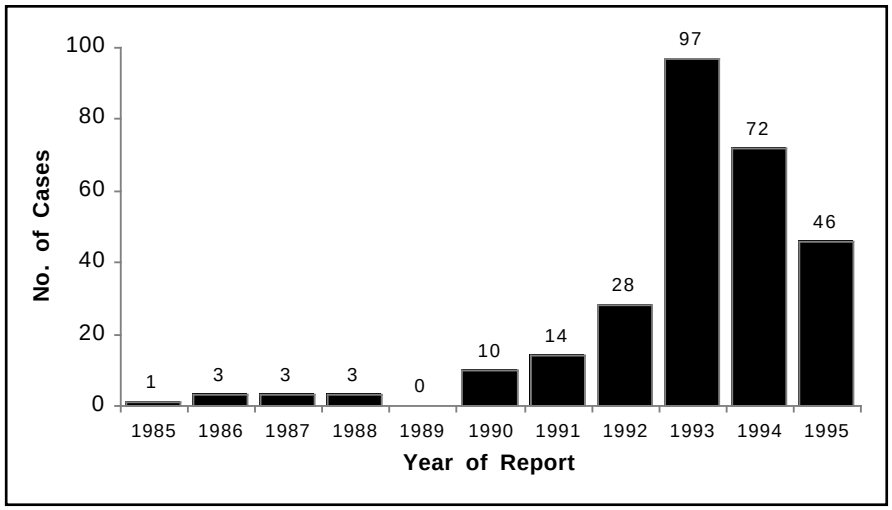

Figure 2. Reported congenital syphilis cases by year of report, Missouri, 1985–95.

The decrease in congenital syphilis cases during 1995 was due to increases in health care provider awareness, screening, diagnosis and treatment of all stages of syphilis. Continued counseling and treatment of pregnant women and women of childbearing age who present with syphilis is critical for the continued reduction of congenital syphilis in Missouri.

Gonorrhea

Reported cases of gonorrhea in Missouri decreased by ten percent, from 12,556 cases in 1994 to 11,303 cases in 1995. This corresponds to a decrease in the rate of reported gonorrhea cases from 237.9 per 100,000 in 1994 to 220.9 per 100,000 in 1995. St. Louis City, St. Louis County and Outstate Missouri reported decreases in gonorrhea incidence from 1994 to 1995 of 16 percent, 16 percent and 12 percent, respectively. Kansas City reported a six percent increase in gonorrhea cases, which could reflect a slight growth in the actual number of gonococcal infections in the community, or it could be the result of changes in diagnostic, reporting, and/or surveillance practices.

This is the seventh consecutive year in which decreases in gonorrhea incidence have been reported for St. Louis City, St. Louis County and Outstate Missouri. Similarly, data from the Infertility Prevention Project (IPP) in Missouri indicate a decrease in the rate of positive tests for gonococcal infection, even though screening within the project has been realigned to target those populations at highest risk.

Specific surveillance for antibiotic-resistant strains of gonorrhea is not conducted in Missouri. However, all gonorrhea in the state is considered to be resistant to penicillins and tetracyclines, and these classes of drugs should not be used to treat persons infected with *Neisseria gonorrhoeae*.

Gonococcal Pelvic Inflammatory Disease (GPID)

Reported cases of GPID in Missouri decreased by 53 percent, from 286 cases in 1994 to 133 cases in 1995. Decreases in reported incidence occurred in St. Louis City, from 120 cases in 1994 to 49 cases in 1995; St. Louis County, from 73 cases in 1994 to 23 cases in 1995; and Outstate Missouri, from 73 cases in 1994 to 41 cases in 1995. No change in incidence occurred in Kansas City, where 20 cases were reported in both 1994 and 1995.

Non-Gonococcal Urethritis (NGU)

Reported cases of NGU in Missouri increased 40 percent, from 6,063 in 1994 to 8,511 in 1995. Increases were noted in St. Louis City, from 3,635 cases in 1994 to 3,675 cases in 1995; St. Louis County, from 265 cases in 1994 to 2,675 cases in 1995; and Kansas City, from 1,623 cases in 1994 to 1,639 cases in 1995. A decrease in reported cases occurred in Outstate Missouri, from 540 cases in 1994 to 522 cases in 1995. Effective January 1, 1996, the bureau discontinued collecting data on NGU because it is no longer reportable in Missouri after April 30, 1996.

Chlamydial Infections

Reported *Chlamydia trachomatis* infections in Missouri decreased one percent, from 12,244 cases in 1994 to 12,084 cases in 1995. The statewide morbidity rate per 100,000 decreased from 239 in 1994 to 236 in 1995. Forty percent of 1995 *Chlamydia* cases were reported from the St. Louis (2,790) and Kansas City (1,997) metropolitan areas.

Increased screening for chlamydial infections is currently taking place as part of the IPP. Of those persons screened by

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Core STD/HIV Prevention Services

Surveillance of Infection and Disease

Disease Intervention, Counseling and Treatment

Health Education and Technical Assistance

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the IPP, primarily in family planning and STD clinics, females less than 25 years of age have been found to be the group at highest risk of infection. *Chlamydia* positivity for these individuals has ranged from 4.2–11.3 percent. Resources have been realigned to allow for increased targeted screening of these young women, and such targeted screening efforts will continue.

Acquired Immunodeficiency Syndrome (AIDS)

During 1995, 769 cases of AIDS were reported in Missouri residents, bringing the total number of cases reported since 1982 to 6,341. See Figure 3. Of these 6,341 cases, 3,662 (57.8%) are known to have died. In 1995, AIDS was the third leading cause of death for Missourians 25–44 years of age. Nationally, AIDS is the leading cause of death for persons in this age group.

The 769 cases of AIDS reported during 1995 represented a six percent increase from the 727 cases reported in 1994. However, the overall epidemic in the state continues to show evidence of plateauing. See Figure 3. This plateauing is not evident in certain subpopulations, such as African Americans and persons infected through heterosexual contact, where the annual numbers of reported cases have continued to increase.

The significant increase in the number of reported cases in 1993 was due to the implementation of a less restrictive case definition, coupled with enhanced surveillance activities in St. Louis and Kansas City as these areas sought to quality for increased federal funding as Ryan White Title I cities.

Human Immunodeficiency Virus (HIV) Infection

Through the end of 1995, a total of 3,428 HIV cases had been reported in Missouri residents; 605 of these cases were reported during 1995. HIV cases are persons who are infected with HIV but do not meet the case definition for AIDS.

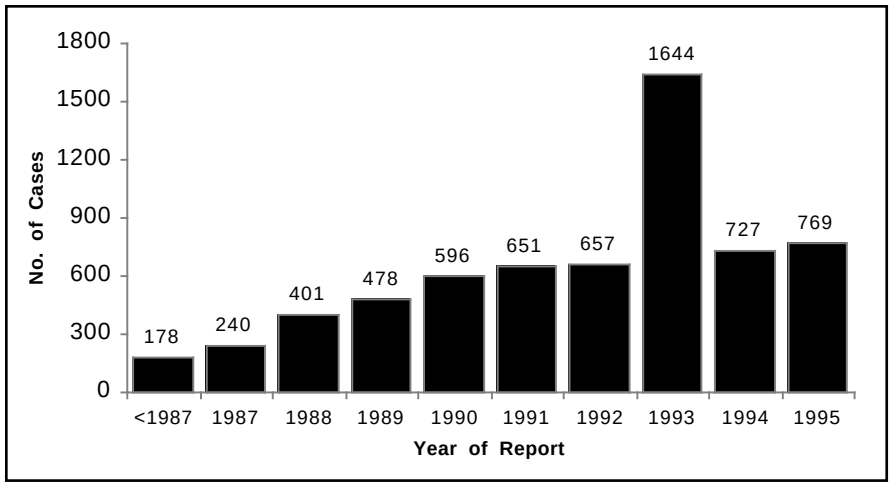

Figure 3. Reported AIDS cases by year of report, Missouri, <1987–95.

In recent years, the annual rate of HIV infection among childbearing women in Missouri has remained generally stable. The prevalence of HIV infection among those women who delivered a child in 1994 was approximately six per 10,000 women. The average HIV prevalence in childbearing women for the period from 1991-94 has been about five per 10,000. In May 1995, the Assistant Secretary of Health requested that all states cease HIV seroprevalence surveillance in childbearing women. Missouri consequently stopped such surveillance, but plans to resume it on a more limited basis in the latter part of 1996.

HIV/AIDS Cases by Gender

The substantial majority of AIDS and HIV cases continue to be reported in males. Of the 6,341 cumulative AIDS cases which have been reported through 1995, 5,899 (93%) were males. However, females have slowly but progressively been making up a larger proportion of annually reported AIDS cases, and in 1995, approximately 11 percent of the total were females. Females also appear to be making up a higher proportion of more recently infected persons. This is indicated by the fact that females represent 14 percent of cumulative HIV cases, but only 7 percent of cumulative AIDS cases.

HIV/AIDS Cases by Race and Ethnicity

Whites make up a majority of reported AIDS and HIV cases (70 percent of cumulative AIDS cases and 51 percent of cumulative HIV cases, with white males contributing 66 percent of all AIDS cases and 46 percent of all HIV cases). However, African Americans, along with Latino males, are overrepresented in the epidemic. The rate per 100,000 in Mis-

Populations Disproportionately Impacted by AIDS in 1995:

- Men who have sex with men represented 67% of the adult/adolescent AIDS cases reported in Missouri in 1995
- African Americans represented 47% of the HIV cases reported in Missouri in 1995
- The rate per 100,000 for HIV cases reported in Missouri in 1995 in African Americans was 7.6 times the rate in whites. The corresponding rate in Latinos (based on 13 reported cases) was 3.1 times that of whites.

souri for both AIDS and HIV cases is much higher in African Americans than in whites, with Latinos having intermediate rates. For AIDS cases reported in 1995, the rate in whites was 10 per 100,000; in African Americans, 52 per 100,000; and in Latinos, 28 per 100,000. For HIV cases reported in 1995, the rate in whites was 7 per 100,000; in African Americans, 51 per 100,000; and in Latinos, 21 per 100,000. Nationwide, AIDS case rates are 17 per 100,000 for whites, 101 per 100,000 for African Americans and 51 per 100,000 for Latinos. Nationwide HIV case rates are not known, since all states do not have HIV reporting.

HIV/AIDS Cases by Age Group

Among cumulative AIDS cases, the largest percentage (46%) were diagnosed between the ages of 30–39; the second largest percentage (24%) were diagnosed between the ages of 20–29. Among cumulative HIV cases, the largest percentage (42%) were diagnosed between the ages of 20–29; the second largest percentage (38%) were diagnosed between the ages of 30–39.

Approximately 4.5 percent of all HIV cases were diagnosed in teenagers; this includes 15 percent of cases among African American females, 10 percent among white females, 4 percent among African American males and 2 percent among white males. In addition, some AIDS and HIV cases who were first diagnosed in their 20s were likely to have been initially infected while in their teens. Once again, a comparison cannot be made with HIV cases nationwide because all states do not have HIV reporting

HIV/AIDS Cases by Exposure Category

In 1995, 507 AIDS cases and 316 HIV cases were reported in men who have sex with men (MSM). The proportion of annually reported AIDS cases contributed by the MSM exposure category has remained generally constant at approximately 70 percent since 1990.

Reportable STDs and Conditions

- Syphilis
- Chlamydia trachomatis infections
- Gonorrhea
- Human immunodeficiency virus (HIV) infection, confirmed
- Acquired immunodeficiency syndrome (AIDS)
- T-Helper (CD4+) lymphocyte count on any person with HIV infection

STDs No Longer Reportable

(Effective April 30, 1996)

- Genital Herpes
- Lymphogranuloma venereum
- Non-gonococcal urethritis
- Granuloma inguinale

In 1995, 75 AIDS cases and 56 HIV cases were reported in injecting drug users (IDU). The proportion of annually reported AIDS cases contributed by IDUs has, in general, been very slowly increasing, although it decreased slightly to about ten percent of total reported cases in 1995.

In 1995, 78 AIDS cases and 67 HIV cases were reported in heterosexual contacts. The proportion of annually reported AIDS cases contributed by heterosexual contacts has been progressively increasing and, during 1995, this exposure category accounted for approximately 11 percent of total reported cases. In addition, in recent years, AIDS cases attributed to heterosexual contact have shown the highest average annual rate of increase compared to cases associated with other exposure categories.

Among more recently infected males, an increasing proportion appear to have been infected through heterosexual contact and injecting drug use. However, MSM exposure remains a very important means by which new infections are occurring. There is a difference in infection rates among MSM 29–39 years and MSM 19–29 years. It appears that younger MSM, as well as those who do not self-identify as gay or bisexual, may be at increased risk for acquiring HIV infection.

Among more recently infected females, an increasing proportion appear to have been infected through heterosexual contact.

Almost all recent infections in children have been the result of mother-to-infant (perinatal) transmission.

Prevalence of HIV Infection in Missouri

The bureau estimates that there are currently 8,000–11,000 HIV-infected individuals living in Missouri. This estimate was calculated using techniques recommended by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). This estimate would indicate that approximately 55–75 percent of HIV-infected persons in the state have been diagnosed and reported to public health officials. It would also indicate that approximately 2,000–5,000 HIV-infected persons are currently living in Missouri who have not been diagnosed and reported.

For additional information:

STD Hotline: (800) 359-6259
AIDS Hotline: (800) 533-AIDS(2437)

CDC Awards SmithKline Beecham Contract for Hepatitis A Vaccine—Communities With Hepatitis A Outbreaks Can Access Vaccine Through Federal Funds

SmithKline Beecham announced in January that it had been awarded a contract by the Centers for Disease Control and Prevention (CDC) to supply Havrix® (Hepatitis A Vaccine, Inactivated), the world's first vaccine for hepatitis A, manufactured by SmithKline Beecham Biologicals.*

The award was made under the Vaccines for Children Program (VFC), which guarantees federal support to supply vaccines of sufficient quantities to the states for a defined group of children. Under the VFC program, *Havrix* will be made available to all eligible children and adolescents, ages 2–18 years, **who live in communities with high rates of hepatitis A virus infection and periodic hepatitis A outbreaks**, as determined by public health officials.

The CDC contract comes at a time when a number of cities across the United States are experiencing a rise in the number of hepatitis A cases. Recently affected geographic areas, according to news reports, include Memphis and Knoxville, TN; Salt Lake City, UT; Butte, MT; McAlester, OK; Portland, OR; and San Antonio and El Paso, TX. Immunization programs targeted to children in certain communities, such as Memphis and Knoxville, TN, have already been put into effect to help stop the spread of the hepatitis A virus.

Children who qualify for immunization include those who are Medicaid-eligible; without health insurance; are Native Alaskans or Native Americans; or children with health insurance which does not cover the cost of vaccines if they receive immunizations at a federally qualified health center or rural health clinic (as defined by the Social Security Act).

This contract covers state health departments and certain local health agencies. State optional user customers are also eligible to purchase from this contract.

Hepatitis A is spread by the fecal-oral route through close person-to-person contact or by ingestion of contaminated food or water. Potential sources of infection include contaminated water, ice, fruits, salads and shellfish. Persons infected with hepatitis A virus often develop symptoms such as jaundice (yellowing of the skin and eyes), fever, nausea, vomiting, diarrhea and appetite loss. Rash and joint pain may also develop.

* On April 15, 1996, Merck & Co., Inc. also released a new hepatitis A vaccine (VAQTA). Even though VAQTA is not available through federal contract, you can contact Merck & Co., Inc. directly to purchase the vaccine.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Mar 96	Apr 96	Total YTD
Specimens Tested	9,753	10,277	40,256
Initial (percent)	62.5%	62.4%	25,224
Repeat (percent)	37.5%	37.6%	15,032
Specimens: Unsatisfactory	154	123	636
HT Borderline	1,477	1,564	5,563
HT Presumptive	84	95	326
PKU Borderline	6	4	21
PKU Presumptive Positive	2	0	4
GAL Borderline	71	117	341
GAL Presumptive Positive	1	0	4
FAS (Sickle cell trait)	75	54	287
FAC (Hb C trait)	19	31	96
FAX (Hb variant)	14	12	55
FS (Sickle cell disease)	5	1	10
FSC (Sickle C disease)	0	0	4
FC (Hb C disease)	0	0	1

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Havrix® (Hepatitis A Vaccine, Inactivated) Fact Sheet

Indications and Usage

- Havrix® (Hepatitis A Vaccine, Inactivated) is indicated for active immunization against the hepatitis A virus
- Individuals at risk include:
  - —travelers to endemic areas, including Mexico, parts of the Caribbean, South and Central America, Africa, Asia (except Japan), the Mediterranean basin, Eastern Europe and the Middle East
  - —military personnel
  - —native peoples of Alaska and the Americas
  - —homosexuals
  - —users of illicit injectable drugs
  - —residents of a community experiencing an outbreak of hepatitis A
  - —certain institutional workers (e.g., caretakers for the developmentally challenged)
  - —employees of child day-care centers
  - —laboratory workers who handle live hepatitis A virus (HAV)
  - —handlers of primate animals that may be harboring HAV
- Outbreaks also have been attributed to food handlers and children in day-care centers

Description

- *Havrix* is a suspension formula that contains inactivated HAV that has been adsorbed onto the surface of aluminum particles and suspended in a sterile solution.
- In adults, a single dose of *Havrix* induces immunity. By day 15, 80 to 98 percent seroconvert with specific antibodies against HAV.
- In adults, a single dose of *Havrix* elicited antibodies against hepatitis A in 96 percent of subjects when measured one month after vaccination. A booster dose is administered 6–12 months after the initial injection to prolong protection.
- *Havrix* does **not** contain any human blood or plasma-derived components, whereas immune globulin (IG), which is used for passive, short-term prevention, is a blood-derived product.

Efficacy

Havrix has been shown to be safe and effective in extensive worldwide clinical trials, including a landmark study in Thailand of 40,000 subjects. In six other clinical studies in children, *Havrix* elicited antibodies against hepatitis A in 99 percent of subjects following the primary course. The vaccine has been used in more than 40 countries including Austria, Belgium, France, Germany, Hong Kong, Ireland, Italy, Sweden, Switzerland and the United Kingdom, with millions of doses distributed worldwide. *Havrix* was licensed by the U.S. Food and Drug Administration on February 22, 1995.

Mechanism of Action

Havrix promotes immunity to the hepatitis A virus by stimulating the production of specific antibodies against the virus, without causing any symptoms of the disease.

Safety

Havrix is generally well tolerated. The most common solicited adverse effects in clinical trials were injection-site soreness (56 percent of adults and 15 percent of children) and headache (14 percent of adults and less than 5 percent of children). As with all vaccines, expanded commercial use could reveal rare adverse events not observed in clinical studies.

Contraindications

Havrix is contraindicated in people with known hypersensitivity to any component of the vaccine.

Hazardous Substances Emergency Events Surveillance (HSEES) 1995 Annual Report October 1, 1994 - September 30, 1995

Lori J. Harris
Bureau of Environmental Epidemiology

The Hazardous Substances Emergency Events Surveillance (HSEES) system, established by ATSDR in 1990, collects information on the direct public health impact of non-petroleum hazardous substance emergencies. Missouri's HSEES program completed its second year of data collection on September 30, 1995. As the program continues, new notification sources are explored, information is shared and analysis is done to determine the public health impact of hazardous substance emergency releases in the State of Missouri.

A hazardous substance release is entered into the HSEES system if it meets the following criteria:

1. An uncontrolled or illegal release or threatened release of one or more hazardous substances; **and**

2. The substances that are actually released or threatened to be released include **ALL** hazardous substances, except petroleum products; **and**

3. The quantity of the hazardous substances which are released, or are threatened to be released, need (or would need) to be removed, cleaned up or neutralized according to federal, state or local law; **or**

4. Only a threatened release of hazardous substances exists, but this threat leads to an action, such as an evacuation, that can potentially impact on the health of employees, responders or the general public. This action makes the event eligible for inclusion into the surveillance system even though the hazardous substances are not released.

Analysis of Data on Hazardous Substances Emergency Events

The Missouri Department of Natural Resources Environmental Services Program maintains Environmental Emergency Response (EER) reports. All environmental emergencies should be reported, 24 hours a day, to (573) 634-2436. A total of 1,694 reports were received from October 1, 1994 through September 30, 1995. Of these, 859 (51%) were petroleum related, and 366 (22%) were potential hazardous substances emergency events, of which 163 met the criteria and were entered into the HSEES system.

Beginning in January 1995, the HSEES program started receiving faxed reports from the U.S. Coast Guard's National Response Center (NRC) on a daily basis. A total of 90 potential hazardous substances emergencies were reported for Missouri, of which 61 (68%) were entered into the HSEES database.

From January 1 through August 31, 1995, 278 reports made to the national Department of Transportation Hazardous Materials Incident System (HMIS) were investigated. The majority of these incidents are from package delivery companies which report damaged packages, even though the amount of substance released is not enough to warrant clean-up or to cause a public health action. Of the 278 reports, 85 (31%) events were entered into the HSEES database. Seventy (82%) of these reports came from three package delivery companies.

Table 1. Most Commonly Released Hazardous Substances, HSEES, Missouri, October 1, 1994 through September 30, 1995.

Substance	No. of Events	Percent of Events
Ammonia	43	(13.5%)
Sulfuric acid	19	(6.0%)
Ethylene glycol	18	(5.7%)
Sodium hydroxide	12	(3.8%)
PCBs	11	(3.5%)
Lead	9	(2.8%)
Phosphoric acid	9	(2.8%)
Hydrochloric acid	8	(2.5%)
Asbestos	8	(2.5%)
Toluene	7	(2.2%)

Out of the 734 events from all sources investigated by the HSEES Coordinator, 329 investigations were entered into the HSEES database; 318 (97%) of these met the case definition. This represents a 65% increase over fiscal year 94, which had 193 events.*

A total of 349 substances were released in the 318 events. The majority of events (292/92%) involved release of only one substance. Table 1 shows the most commonly released substances.

Events occurred throughout the state, in 61 counties and the City of St. Louis. This represents slightly over 50 percent of the counties of the state. Figure 1 shows the number of events occurring in each county.

One hundred seventy (53%) of the releases occurred at fixed facilities while 148 events (47%) were transportation related. Of the 318 events, 271 (85%) occurred on weekdays; 47 events (15%) occurred on the weekend. More than half the events (179/56%) occurred between 6 a.m. and 6 p.m., with 136 (54%)

*****Because reports were received and included from the HMIS reporting system, the number of transportation- related cases entered into the Missouri HSEES system greatly increased in FY95. This increase does not necessarily reflect more incidents occurring in FY95 over FY94, only that the HSEES system became aware of more incidents through this added reporting source. This should result in more complete data in subsequent years.

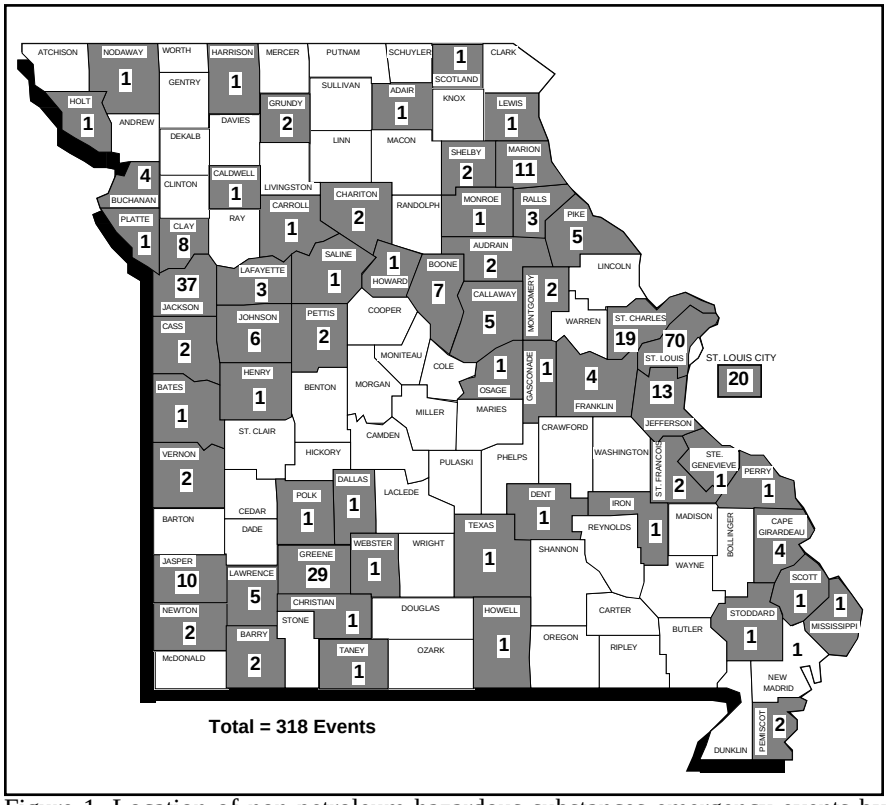

Figure 1. Location of non-petroleum hazardous substances emergency events by county, Missouri HSEES, October 1, 1994–September 30, 1995.

Table 2. Substances Involved in Hazardous Substances Emergency Events Evacuations, HSEES, Missouri, October 1, 1994 through September 30, 1995.

Substance	No. of Events	Number Evacuated
Ammonia	10	1,352
Acids	3	370
Solvents	3	330
Lead	2	100
Inorganics	2	8
Insecticide	1	1
Asbestos	2	Unknown
Oxidizers	2	Unknown

occurring between the core working hours of 8 a.m. and 5 p.m., Monday–Friday. Forty-five (14%) occurred between 6 p.m. and midnight and 50 (16%) occurred between midnight and 6 a.m. The time of occurrence was unknown for 39 (12%) of the events occuring on weekdays, and 7 (2%) events occuring on weekends.

Evacuations were ordered in 22 (7%) events. The number of people evacuated was known for 17 events and unknown for five events. For the 17 events, a total of 2,161 people were evacuated. The largest number of known people evacuated for an event was 400 and the smallest number was zero. Sixteen of the events involved the evacuation of affected building(s) or part of the building, four were circle/radius evacuations, one was a downwind evacuation and one had no criteria. A total of 27 substances were released in these 22 events.

Ammonia was the most commonly involved substance, occurring in ten events with a total of 1,352 evacuees. Table 2 shows other substances involved. One event involved release of two forms of ammonia, ammonium nitrate and ammonia phosphate.

Nine (3%) events resulted in 13 injuries and one death. The largest number of injuries associated with an event was two. The most common type of injury reported was respiratory irritation, which occurred in six (43%) of the victims. Other types of injuries/symptoms included eye irritation, chemical burns, thermal burns, skin irritation, dizziness/CNS, vomiting and trauma.

Of the 14 victims, one died due to trauma, six were treated at the scene, five were transported to a hospital but not admitted and one was admitted to a hospital. One person saw a private physician within 24 hours.

Employees were the largest group injured by hazardous substance releases again this year. Twelve employees were injured and one died. One responder was injured. No members of the general public were injured.

Ammonia, lead, hydrogen sulfide and 1,3,5-trioxane were all involved with incidents which resulted in two injuries (14%) each. One release involving three substances (cleaning compound, phosphoric acid and sodium hydroxide) injured both an employee and a responder.

Reporting Events

We are indebted to the Missouri Department of Natural Resources (DNR) Environmental Services Program for helping us investigate these hazardous substances emergency events. We rely heavily on this unit for notification of releases and frequently contact them for circumstances surrounding a release.

If you are aware of any non-petroleum hazardous substances emergency events that may not have been reported to DNR, please contact Lori J. Harris, HSEES Coordinator, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6111 or (800) 392-7245.

Bureau of Environmental Epidemiology FY 1995 Report

Brian M. Quinn
Bureau of Environmental Epidemiology

The Bureau of Environmental Epidemiology (BEE) is one of the Missouri Department of Health's most diverse units. From risk and health assessment to epidemiological studies, from occupational fatality investigation to childhood lead poisoning prevention, BEE serves Missourians through a wide variety of environmental health programs. Even though BEE is diverse, the bureau is singular in its purpose—to help protect the health and well-being of all Missourians.

Risk Assessment Programs

BEE's risk assessment programs are heavily involved in assessing the risk that hazardous substances in the environment pose to human health. These programs work closely with other state and federal environmental and health agencies, including the United States Environmental Protection Agency, the Missouri Department of Natural Resources, the federal Agency for Toxic Substances and Disease Registry (ATSDR), the Department of Defense and the Department of Energy. These programs assess human risk through several different kinds of documents that discuss exposure levels, safe clean-up levels and various aspects related to exposure to hazardous substances found at hazardous waste sites statewide. The information given in the following sections reflects hours of research, cooperation, coordination, document review and interagency communication by BEE staff during 1995.

Risk Assessment (EPA)

- Completed three site-specific risk assessments.
- Reviewed three risk assessments from other agencies.
- Determined remedial goals for two sites.
- Staff attended four training courses and facilitated two.
- Staff gave four presentations to public and education groups.
- Hired one additional environmental specialist.
- Opened and maintained effective communication and working relationships with numerous local, state and federal agencies and organizations.

For more information, contact the program at (800) 392-7245.

Risk Assessment (State)

- Reassessed 52 abandoned or uncontrolled hazardous waste sites for risks to public health.
- Bureau personnel assisted the Missouri Department of Natural Resources (DNR) to assess eight Department of Defense sites. One site is an active air force base; the other sites are inactive, but are being cleaned up for future productive use.
- Provided health information to DNR to assist with its new Voluntary Cleanup Program. Three of these sites are already being cleaned up, while many other properties are beginning the process.
- Completed 13 clean-up assessments on sites other than abandoned or uncontrolled hazardous waste sites.

For more information, contact the program at (800) 392-7245.

Public Health Assessment (ATSDR)

The Public Health Assessment Program is part of a state cooperative agreement with the ATSDR to conduct health assessment in Missouri communities near hazardous waste sites. Findings from these assessments are reported through different types of documents, including public health assessments, site review and updates, health consultations and site summaries. These documents are designed to inform and educate the communities about the nearby sites, and help them protect themselves from exposure to site-related contaminants and resulting adverse health effects. A tremendous amount of communication, coordination and cooperation with numerous local, state and federal departments and agencies is required to complete the work summarized in this report. This program has also been heavily involved in numerous other sites and issues which are currently in the early stages of community and government activity and development. During 1995, the Public Health Assessment Program:

- Completed one public health assessment.
- Completed four health consultations.
- Completed two site reviews and updates.
- Completed one summary document.
- Hosted or attended eight public availability sessions.

For more information, contact the program at (800) 392-7245.

Missouri Occupational Fatality Assessment and Control Evaluation (MO FACE) Program

This program operates through a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH). It is responsible for conducting in-depth epidemiological investigation of work-related fatalities, including deaths resulting from falls, electrocutions, machinery-related incidents, confined-space incidents and other causes. Occupational Fatality Reports, produced from these investigations, are shared with NIOSH, the employer involved and safety groups statewide. The MO FACE program works closely with employers involved in workplace fatalities to help them take steps to prevent similar incidents from happening again. The program is also developing intervention initiatives, such as workshops

and seminars, to help employers recognize workplace hazards and prevent fatalities before they occur. During 1995, the MO FACE program:

- Completed 19 occupational fatality investigations:
  - 9 machine-related
  - 7 falls
  - 1 electrocution
  - 1 confined-space
  - 1 refuse collection-related
- Received notification of 323 possible workplace fatalities and determined that 133 were traumatic work-related fatalities.
- Transmitted 149 occupational fatality reports to NIOSH—16 were later determined to be non-work related and were deleted.
- Produced first MO FACE newsletter and disseminated more than 800 copies.
- Staff made eight presentations to representatives from local, state and federal agencies, and to college classes.
- Maintained close working relationships with MO FACE surveillance system participants (114 county coroners, 114 sheriff's departments, 548 police departments, 804 fire departments and 221 ambulance services).

For a copy of the 1995 MO FACE Annual Report, contact the program at (800) 392-7245.

Lead Poisoning Prevention Program

The Lead Poisoning Prevention Program is a diverse program, as it is responsible for a variety of issues related to lead poisoning in Missouri. This program coordinates all lead-related programs within the Department of Health, including the CDC Childhood Lead Poisoning Prevention and Control Program, the Lead Licensing and Accreditation Program, the EPA Region VII Lead Training and Outreach Grant Programs, the Medicaid Lead Screening Program and lead poisoning prevention in-service training for local public health agencies. The Lead Poisoning Prevention Program also provides staff support and technical assistance to the Governor's Lead Commission.

Childhood Lead Poisoning Prevention and Control

- Developed lead poisoning screening data to depict the childhood lead poisoning problem in Missouri. Figure 1 shows those counties where enough children have been screened to accurately predict levels of concern.
- Focused efforts on informing health care providers, parents, local health agencies and the public about lead poisoning, and on teaching ways to prevent blood-lead poisoning from harming Missouri's children.
- Environmental specialists continue to work in local communities consulting with local health agencies on environmental lead hazards, as well as helping families with lead-poisoned children to identify sources of lead exposure, and begin taking steps to reduce the exposure and create a lead-safe environment for their children.
- Provided lead poisoning prevention in-service training for local public health agencies.
- Provided on-going technical and staff support to the Governor's Lead Commission.
- Developed a remote/dial-in, server-based system to provide rapid access for all the district health offices, as well as several targeted local health offices to the DOH STELLAR lead database containing blood-lead screening and environmental information gathered in the state.
- Set up a Geographic Information/ Graphics workstation to assist in creating educational presentation materials and implementing spatial data referencing in reports/presentations.

For more information, contact the program at (800) 575-9267.

Lead Licensing and Accreditation

The Missouri Lead Licensing and Accreditation Program is responsible for licensing lead abatement workers and accrediting training programs as mandated by sections 701.300–338, RSMo.

(continued on page 34)

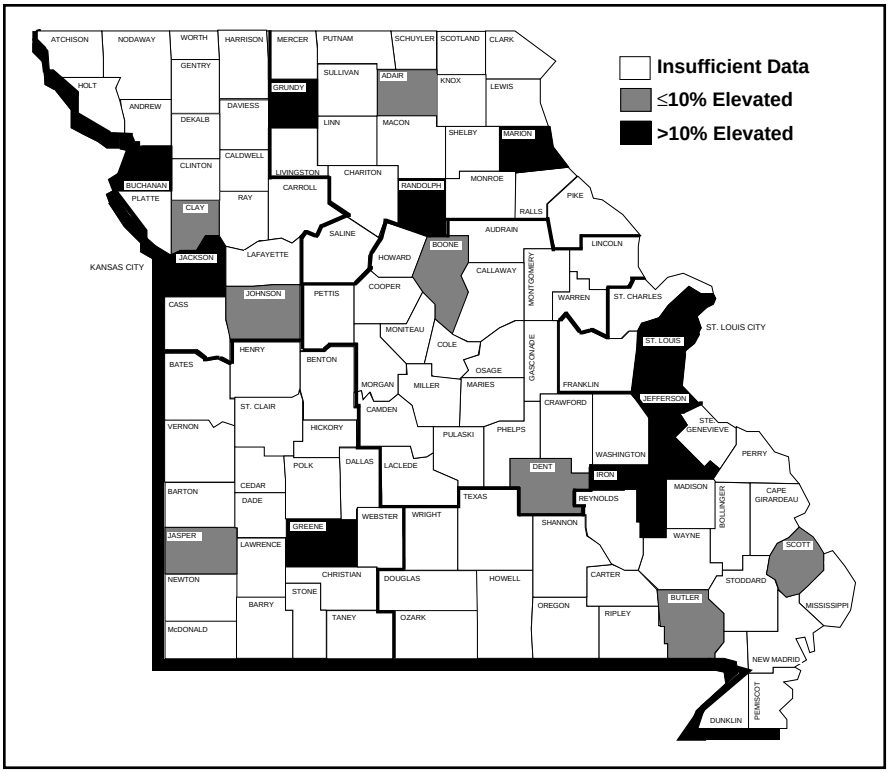

Figure 1. Percent of tests showing elevated blood lead levels in children 6–72 months of age, Missouri, 1995.

(continued from page 33)
The purpose of the program is to ensure that lead abatement workers are properly trained and have the appropriate work experience to do lead abatement work and lead-based paint detection. This is done to prevent childhood lead poisoning caused by improper lead abatement. Since August 1995, this program has:

- Licensed 100 lead inspectors, 64 lead abatement supervisors and 177 lead abatement workers.
- Accredited 16 lead training programs.
- Generated more than $58,000 in revenue from licensing and accreditation fees.

For more information, contact the program at (800) 575-9267

Missouri Hazardous Substances Emergency Events Surveillance (HSEES) Program

The HSEES program is responsible for monitoring, collecting and interpreting information on hazardous substances emergency events (spills, releases, accidents or threats of these). This information is analyzed to provide a clearer picture of how such events affect the health and well-being of Missourians. The results are used to help protect the public from injury and death caused by exposure to future hazardous material releases.

During 1995, this program investigated 734 potential hazardous substances emergency events and identified 318 events as meeting the case criteria. The annual report for this program can be found on pages 30–31of this issue.

For more information, contact the program at (800) 392-7245.

Environmental and Occupational Diseases and Conditions Passive Surveillance System

The bureau maintains a passive surveillance system to document occupational diseases and health conditions which are required to be reported to the Department of Health by 19 CSR 20-20.020 and 19 CSR 20-20.080.

During 1995, the passive surveillance system received 13,767 cases of environmental and occupational diseases and conditions. This number does not include cases of lead poisoning in children under 6 years of age, which are tracked by the bureau's lead program.

For more information, contact the program at (800) 392-7245.

Radiological Health Program

The Radiological Health Program is responsible for overseeing and regulating sources of ionizing radiation in nonmedical settings, including nuclear pharmacies and industrial radiography. The program is also involved in emergency response and environmental radiation activities. The program staff conduct radon surveys statewide and provide radon information through seminars, displays and public awareness presentations. The Radon Hotline provides Missouri residents easy access to radon information. During 1995, the Radiological Health Program:

- Continued to register and re-register ionizing radiation sources used in nonmedical settings
- Program and bureau staff participated in extensive training activities in preparation for emergency events at the Callaway and Cooper nuclear plants. Training included drills, dress rehearsals and exercises. The Callaway exercise was federally evaluated and the bureau successfully demonstrated the capability to protect public health and safety in the event of a nuclear plant emergency event.
- Participated for the sixth year in an EPA radon grant which provides funding for radon activities concentrated in counties that have a high potential for elevated radon levels. Activities included radon surveys in schools, daycare centers and numerous residences.
- Continued to maintain and cultivate close working relationships with local, state and federal departments and agencies, including the American Lung Association, Missouri Association of School Administrators, Missouri Public Health Association and Missouri State Medical Association.
- Presented 14 radon awareness programs at seminars, health fairs and other meetings.
- Received approximately 1,200 phone calls through Radon Hotline.

For more information, contact the Radon Hotline at (800) 669-7236.

Special Studies

One of BEE's most important functions is to coordinate and conduct special epidemiological studies, which are designed to determine whether and to what extent Missourians are exposed to hazardous substances in the environment. These studies require a tremendous amount of time, effort, coordination, planning, financial resources and personnel. A study may also take up to two years or longer to complete from inception to the published final report. The following summarizes the bureau's special study efforts in 1995.

The bureau is conducting a lead exposure study in children between the ages of 6 months and 6 years living in the area around the Big River Mine Tailings Site in St. Francois County. This study is funded by ATSDR. Field work began in April 1995 and was completed in November 1995. The study has found 17 percent of participants in the study area have elevated blood lead levels, compared to three percent in the control area. Analysis of environmental samples and questionnaire data continues. A draft report should be available in late summer of 1996.

In August 1995, the bureau received funding to study the exposure of area residents to emissions from the dioxin incinerator in Times Beach, Missouri. Blood specimens from a sample of the

(continued on page 35)

BEE FY 1995 Annual Report

(continued from page 34)
study group and a comparison group will be collected before, during and after the incinerator's operation. These specimens will be analyzed to determine whether a significant elevation in the area residents' dioxin-blood level has occurred. If so, necessary precautionary actions will be taken to lower their exposure. The first round of sampling was completed in September 1995, the second round is scheduled for July 1996 and the final round will be completed in the fall of 1996.

Under contract with the Department of Health, Washington University School of Medicine conducted an investigation of mold contamination in buildings affected by the 1993 floods in eastern, central and western Missouri. The study also examined the effects of mold exposure on the health of occupants. This study was conducted in 1994 and a final report was received by Department of Health in 1995. The investigation found massive fungal growth and high spore counts in residences not fully cleaned and decontaminated. Approximately one-third of the reoccupied buildings had recurrence of indoor mold growth, suggesting that cleaning and decontamination procedures were often ineffective. One-third of the health questionnaires reported increased upper or lower respiratory tract illness or dermatitis among occupants.

In 1994, the bureau conducted an active surveillance program to locate individuals throughout the state who were experiencing allergic reactions to molds caused by flooding in 1993 or 1994. The program's final report was completed in 1995. The program identified 19 cases, with 63 percent located in eastern Missouri. More cases occurred in females, aged 25-48 years, than in all other groups combined.

For more information on the special studies mentioned above, contact the bureau at (800) 392-7245.

Communicable Disease 1995 Annual Report

(continued from page 4)
District with five cases in 1995 and one case in 1994. See Figure 8. Two of the five cases were too young and one case was too old to be vaccinated.

Reported cases of invasive Hib disease other than meningitis decreased by 59.1 percent, from 44 cases in 1994 to 18 cases in 1995. The 1995 incidence was 68.4 percent lower than the five-year median of 57 cases. See Figure 5. This disease was down in all districts except Central and Northeastern. See Figure 8. It is suspected that reporting of other invasive Hib disease is incomplete.

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HIV Recommendations

(continued from page 23)
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TB 1995 Annual Report

(continued from page 12)
For the first time in five years, the number of tuberculosis cases in Missouri among the foreign-born declined from 30 (13.8%) in 1994 to 27 (11%) in 1995. However, case rates among foreign-born Asians are disproportionately higher than for other racial and ethnic groups. Asians accounted for 22 (9%) of all reported cases, with a case rate of 41.3 per 100,000 population in 1995. This is substantially lower than the case rate of 61.8 in 1994.

Tuberculosis control efforts in Missouri were very effective in 1995 with the following accomplishments:

- Decrease in tuberculosis morbidity
- Decrease in childhood tuberculosis cases
- Decrease in case rates among some minority groups
- Decrease in the number of TB/HIV cases
- Decrease in the number of foreign-born tuberculosis cases
- Decrease in the number of tuberculosis cases in correctional facilities.

The state and local health departments' multifaceted approach to providing screening of high-risk populations (nursing homes, state correctional facilities and drug treatment centers), an incentives program to ensure completion of treatment, educational activities geared toward patients and health care providers, as well as the strong emphasis on directly observed therapy (DOT) and completion of therapy, is beginning to show results.

If this downward trend in tuberculosis morbidity continues over the next five years, Missouri will realize its interim goal of no more than 175 new tuberculosis cases by the year 2000 and will be well on its way to its ultimate goal of tuberculosis elimination by the year 2010.

Missouri EPIDEMIOLOGIST

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The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by Mahree Skala, MA, Deputy Director, of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled. 

Immunization Update 1996

Physicians and other interested medical personnel can review the latest information on vaccines for adults and children during one of two broadcasts of a live satellite videoconference on September 19, 1996.

Immunization Update 1996 will originate from the Centers for Disease Control and Prevention (CDC) in Atlanta and will be broadcast live to sites nationwide over the Public Health Training Network and the Health and Sciences Television Network (PHTN) and the Health Sciences Television Network (HSTN). This two-and-a-half hour videoconference will be carried by several sites in Missouri and by about 400 others nationwide. The broadcast will be from 7:00 a.m. to 9:30 a.m. CDT and again from 10:00 a.m. to 12:30 p.m. CDT.

The conference will present the most current information available in the constantly changing field of immunization. Content will largely be determined by vaccine licensure activities of the Food and Drug Administration this summer and by upcoming recommendations of the Advisory Committee on Immunization Practices (ACIP). Anticipated program topics include expanded use of inactivated polio vaccine in the United States, routine use of acellular pertussis vaccine in infants, adolescent immunization and strategies for improving vaccination levels in patient populations.

Dr. William Atkinson, medical epidemiologist with the National Immunization Program, CDC, will lead the conference, which will include an interactive question and answer session. Participants throughout the country can phone questions or comments for Dr. Atkinson on toll-free phone lines.

Immunization Update 1996 is designed for physicians, nurses, physician assistants, nurse practitioners and their colleagues in both the public and private sectors who give immunizations or set policy for their offices, clinics or infection control and communicable disease programs. The conference targets a wide array of health care providers from those new to the field to professionals with years of experience.

Participants who pass the final examination and complete a course evaluation can receive CMEs, CEUs and nursing contact hours, pending approval of the course for accreditation.

For more information, contact the Bureau of Immunization at (573) 751-6133.

Missouri EPIDEMIOLOGIST

Volume XVIII, Number 4 *July–August 1996*

1995–96 Influenza Summary

Irene Donelon, M.P.A.
Bureau of Communicable Disease Control

The 1995–96 influenza season had an early onset, with the first laboratory-confirmed case of influenza reported on November 13, 1995, in an 8 year old child from St. Louis County. There were a total of 384 laboratory-confirmed cases of influenza reported in Missouri during the 1995–96 season. Three hundred and seven (80%) cases were type A, with 70 subtyped as H1N1 and 12 subtyped as H3N2. Seventy-seven (20%) cases were type B influenza, with eight subtyped as B/Beijing-like. Two distinct peaks of confirmed illness occurred during the season: influenza A, which peaked during week 51 and influenza B, which peaked during week 10. See Figure 1.

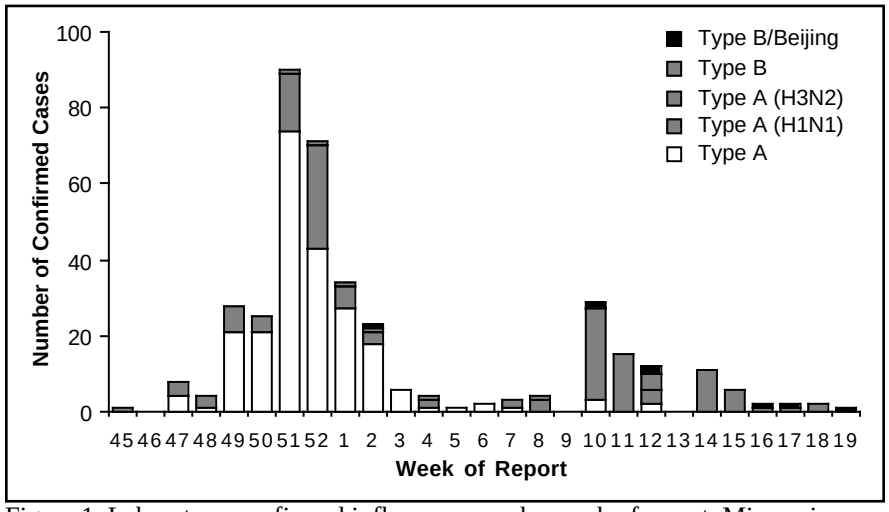

Figure 1. Laboratory-confirmed influenza cases by week of report, Missouri, 1995/96 season.

The 1995–96 influenza season was characterized by many outbreaks of influenza-like illness including: 49 outbreaks in schools, of which 41 closed (four persons were confirmed as type A with three of these subtyped H1N1); two outbreaks in universities [one person had confirmed type A (H1N1) and type A (H3N2) and another person had confirmed type A (H3N2) and type B/Beijing-like]; three unconfirmed outbreaks in long-term care facilities; one unconfirmed outbreak in a preschool; and one community-wide outbreak con-

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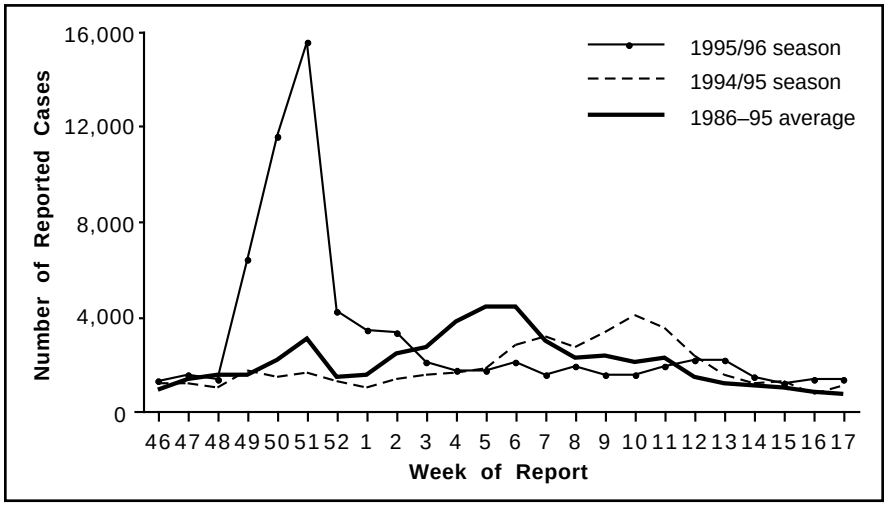


Figure 2. Influenza-like illness by week of report, Missouri, 1995/96 season, 1994/95 season and 1986–95 average.

Inside this Issue...

(continued from page 1)
firmed as type B/Beijing-like. All of the outbreaks in school settings occurred prior to the Christmas break. One of the university outbreaks occurred during early February, and the other occurred during mid-March reflecting the occurrence of a lengthy flu season.

Influenza-like illness peaked during week 51 and then declined to baseline levels for the rest of the season. Reports of influenza-like illness did not rise during the time confirmed influenza B was being reported. See Figure 2.

Pneumonia and influenza deaths fluctuated around the previous 12-year average for the entire season, with a small peak during weeks two through six. See Figure 3.

Figure 4 depicts laboratory-confirmed influenza cases by county of residence.

1996-97 Influenza Season

The Food and Drug Administration Vaccines and Related Biological Products Advisory Committee has recommended that the 1996-97 trivalent influenza vaccine for the United States contain A/Texas/36/91-like (H1N1), A/Wuhan/359/95-like (H3N2), and B/Beijing/184/93-like hemagglutinin antigens. For both A/Wuhan/359/95-like and B/Beijing/184/93-like antigens, United States manufacturers will use the antigenically equivalent strains A/Nanchang/933/95 (H3N2) and B/Harbin/07/94 because of their growth properties.

Recommendations for the use of influenza vaccine for the 1996–97 season can be found on pages 12 and 13 of this issue.

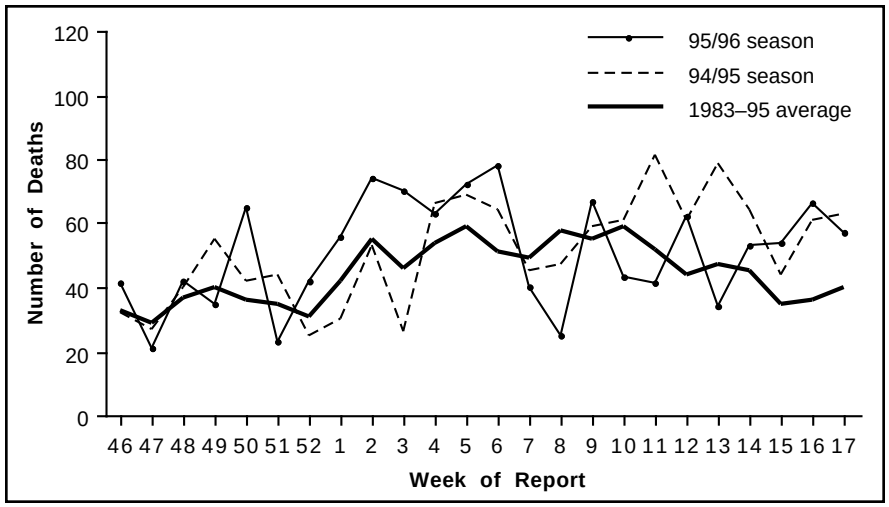


Figure 3. Pneumonia and influenza deaths by week of report, Missouri, 1995/96 season, 1994/95 season and 1983–95 average.

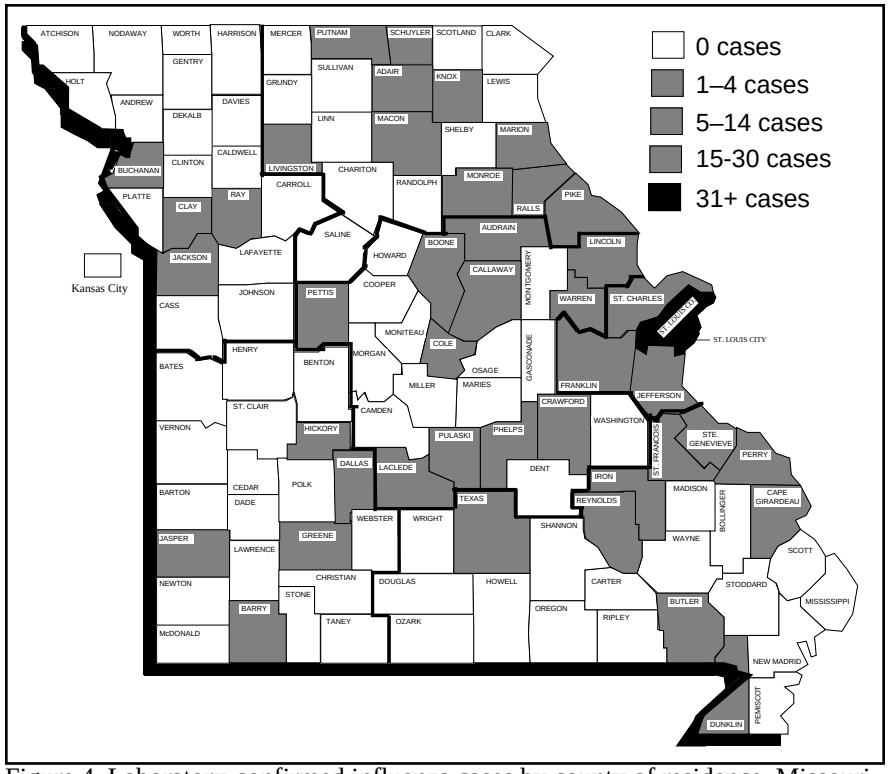


Figure 4. Laboratory-confirmed influenza cases by county of residence, Missouri, 1995/96 season.

Surveillance of Vaccine-Preventable Diseases

A Public Health Training Network Satellite Videoconference
December 5, 1996 11:00 a.m.–2:30 p.m. CST

This live, interactive satellite videoconference will provide guidelines for vaccine-preventable disease (VPD) surveillance, case investigation and outbreak control. The 3.5 hour broadcast will feature a question and answer session in which participants nationwide can address questions to the course instructors on toll free telephone lines. Target audience includes nurses, physicians, epidemiologists, sanitarians, infection control practitioners, laboratorians, disease reporters and others involved in surveillance and reporting of VPDs.There is no charge for this videoconference. **For more information about the course, or for site locations, contact the immunization representative in your district or the Bureau of Immunization at (573) 751-6133.**

New State Law Concerning On-Site Sewage Systems

Stan Cowan
Bureau of Community Environmental Health

For a number of years, raw or inadequately treated domestic sewage has flowed into Missouri streams, lakes and groundwater supplies. It was not uncommon that private wells supplying drinking water for households were contaminated by inadequately treated sewage that had infiltrated into the groundwater source. The Department of Health did not have sufficient authority to abate complaints by homeowners about sewage flowing onto their property from a neighbor's malfunctioning system. Exposure to raw sewage, whether directly or indirectly from flies or pets that have been in contact with the sewage, can lead to exposure to diseases such as hepatitis A, salmonellosis and other gastrointestinal diseases.

The Missouri legislature responded to these problems in 1994 by amending the state law pertaining to individual on-site sewage systems. The new and amended statutes (sections 701.025–059, RSMo) provide authority for abatement of complaints and also authorize the Department of Health to promulgate rules that establish minimum construction standards for on-site sewage systems, establish standards for certification and training of persons to perform soil testing and allow response to requests from lending institutions for evaluation of existing on-site sewage systems. The department rules (19 CSR 20-3.060, 19 CSR 20-3.070 and 19 CSR 20-3.080) went into effect January 1, 1996.

The Department of Health's goal in promulgating these rules is to improve the public health of Missourians through:

- implementation of criteria defining a site's suitability for sewage disposal
- establishment of minimum construction standards for on-site sewage systems
- establishment of standards for inspection of on-site sewage systems
- training of personnel associated with the design and installation of on-site sewage systems.

The new law requires anyone installing a new on-site sewage system or making major repairs to an existing system in areas of the state not governed by local ordinance to first obtain a permit from the Department of Health. The law exempts the requirement for a permit for single family residence lots of three acres or more in size, provided they are not adjacent to a major lake. Before an installation permit will be issued, information regarding site conditions and the plans for the particular system must be provided. If a local sewage ordinance with construction standards at least as strict as state standards is in effect, the local ordinance will prevail and the Department of Health will only be minimally involved. As of August 1996, 650 construction permits have been issued by the Department of Health.

The new law also requires the Department of Health to offer training courses to installers and percolation testers. Persons successfully completing the training will be included in a published listing as registered installers and/or certified percolation testers. An installer is not required to be registered in order to install a sewage system. However, except for soil scientists, percolation testers are required to be certified. As of August 1996, 800 installers have been registered and 975 percolation testers have been certified.

On-site sewage systems that have been installed and were in operation prior to January 1, 1996, will be grandfathered. The Department of Health may only evaluate existing systems under three situations:

- When necessary as part of a communicable disease investigation in the area
- A complaint is received concerning a malfunctioning system
- A lending institution requests an evaluation.

In complaint abatement, the failing portion of the on-site sewage system will have to be repaired to conform to state standards. When a lending institution requests an evaluation of an on-site sewage system, repairs to failing systems will not be required, but the malfunction will be reported to the lending institution. The decision to accept the system as is or to require repairs will be made by the lending institution.

The suitability of a particular location for an on-site sewage system is determined by a site evaluation. The site evaluation will note such factors as the distance from the potential sewage system to a house, well or property line; ground slope; easements; landscape position; and barriers or immovable obstacles. Additionally, the ability of the soil to accept and distribute water is estimated.

Consideration of water movement in soil is critical because the soil acts to both purify the sewage of disease-causing contaminants and distribute the water to prevent ponding. Unacceptable water movement affects either purification, distribution or both. Water movement estimation is the function of a percolation test or a soil morphology evaluation.

The percolation test is the better known of the two tests. Essentially, it consists of digging a hole of a specified size, pouring water into the hole under controlled conditions and recording the rate at which water leaves the hole. State law requires any person performing a percolation test to be formally trained and certified.

The soil morphology evaluation can only be performed by a soil scientist meeting the statutory definition. A soil morphology consists of digging a hole at least four feet deep and examining the layers of soil encountered from the surface to the bottom of the hole. Generally, it is

(continued on page 8)

Statewide Private Well Water Survey

R. Lynn Young
Bureau of Community Environmental Health

Questions were raised during the flood of 1993 about the safety of drinking water from unregulated private wells. In order to address these questions, the nine states (Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wisconsin) affected by the flood worked together with the Centers for Disease Control and Prevention (CDC) to develop a protocol for sampling wells, and interviewing families using these wells, in a survey covering the entire nine-state region.

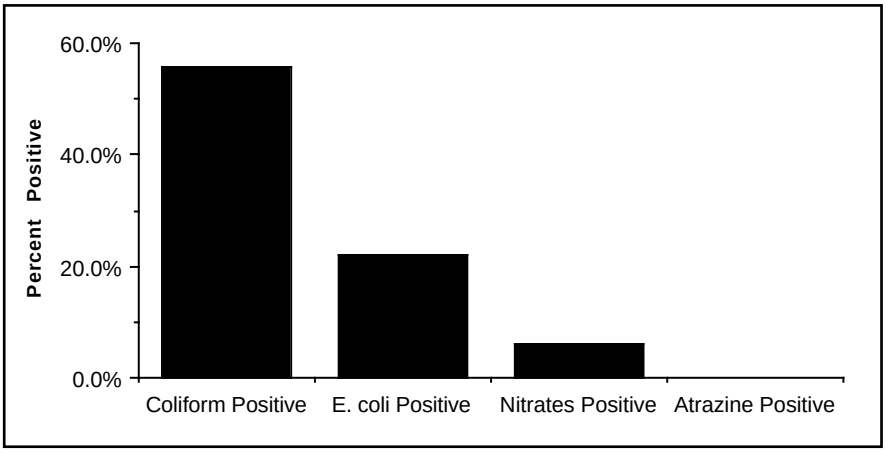


Figure 1. Percent of contaminated water samples from private well water survey by contaminant, Missouri, 1994.

There were four goals to be achieved with the survey:

- Estimate the percentage of contamination in each state;
- Provide information on within-state and within-county distribution of microbiological contamination and contamination by a few specified chemicals;
- Obtain data on levels of background contamination by sampling areas not affected by the flood: and
- Obtain objective data on well construction, operation and maintenance.

A grid system developed by CDC was used for sample site selection to ensure that wells were selected at random. The major criterion for a well to be sampled was that people considered the well water suitable for drinking.

Of the 938 sites selected for sample collection in Missouri, the Department of Health was successful in collecting samples from 861 sites. In some areas served by rural water districts, wells meeting the criterion could not be found.

Test results are shown in Figure 1. Each of the wells were tested for:

- **Coliforms**—A special group of bacteria commonly found in the intestinal tract of warm-blooded animals. Because of this association, coliforms serve as an indicator of fecal contamination. Microorganisms in digestive tract wastes can cause illness with symptoms of nausea, vomiting, abdominal cramps, diarrhea or fever.
- ***E. coli***—A specific member of the coliform group. This organism is closely associated with human fecal waste and presents a real risk of intestinal illness as some *E. coli* are considered human pathogens. Symptoms of illness are similar to those associated with coliforms.
- **Nitrates**—One chemical form of nitrogen, which is essential for making protein in our bodies. Bacteria in the digestive tracts of young children can convert nitrate to nitrite, which can be absorbed into the blood where it interferes with the moving of oxygen from the lungs to the body tissues. Signs of nitrate poisoning include fatigue, lack of stamina, and in severe cases, bluish color of fingertips, toes, and lips.
- **Atrazine**—A herbicide used for weed control on cropland. It is the most common agri-chemical used in the United States. Health concern about atrazine centers on its cancer-causing potential. Increased cancer risk would require long-term exposure to contaminated water or occupational exposure to concentrated forms of atrazine.

The survey showed that there were three general types of wells in the state:

- **Drilled wells**—Generally deep wells (greater than 100 feet) found in limestone formations throughout Missouri;
- **Driven, jetted or sandpoint wells**—Shallow wells found in river bottoms and in the Bootheel area. This type of well is typically installed by the individual landowner driving a pipe 10–30 feet deep into sandy soils;
- **Bored or dug wells**—Shallow (less than 50 feet) large diameter wells found in the glacial till areas of north Missouri and along the prairie region of western Missouri.

Some of the most important information gained from the survey was derived from reviewing laboratory results based on well type See Figure 2. Over 90 percent of the bored and dug wells tested positive for total coliform, and in excess of 60 percent showed direct human fecal contamination by testing positive for *E. coli.* These alarming results were the reason the Department of Health released information on the survey in the fall of 1994 prior to a complete nine-state report.

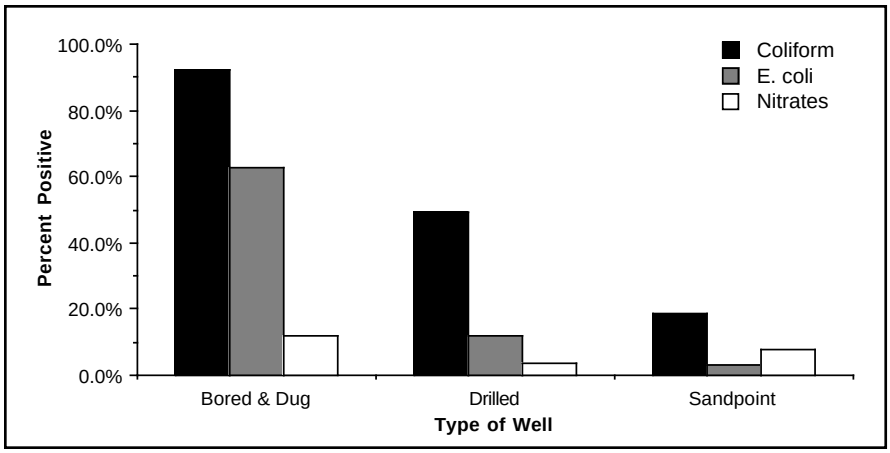


Figure 2. Percent of contaminated water sample results from private well water survey by well type, Missouri, 1994.

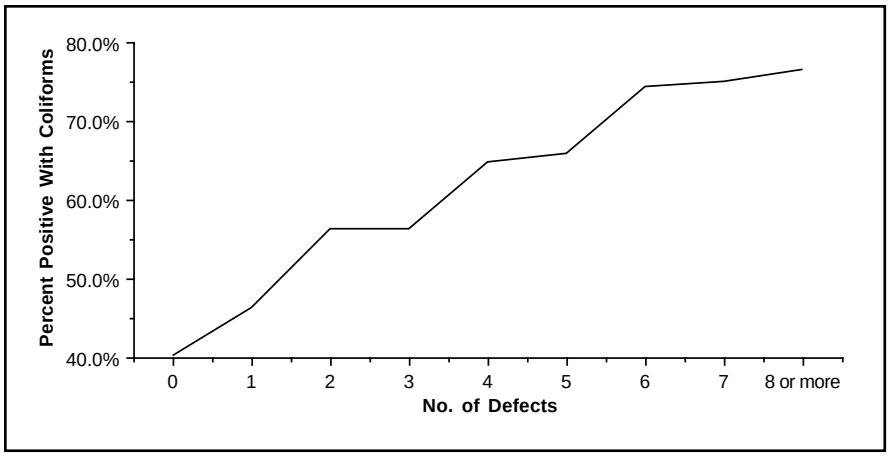


Figure 3. Percent of contaminated water sample results from wells with less than desirable construction discovered in private well water survey, Missouri, 1994.

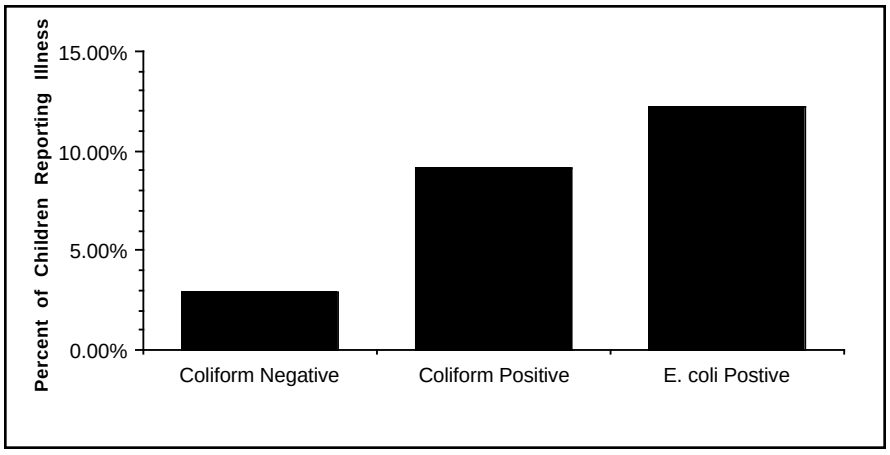


Figure 4. Percent of children less than 6 years of age reporting illness in private well water survey by contaminant, Missouri, 1994.

Based on information gathered from the survey questionnaire, as the number of construction or location defects increased in wells with undesirable construction, so did the percentage of samples positive for coliform. See Figure 3. This information has validated the department's long-held belief that proper well construction is an important factor in assuring a safe water supply.

Of the 2,578 individuals surveyed, only 73 (2.8%) reported diarrheal illness in the two weeks prior to the survey. As shown in Figure 4, 12.2 percent of the children less than 6 years of age drinking *E. coli*-positive water reported three or more loose or watery stools within one 24-hour period during the two weeks prior to the survey. This compares to only 2.9 percent reported illness in similar children drinking coliform-negative water.

The statistics stated above, along with many others from the Phase I study, were significant at the level of $p < 0.0001$.

With all the information gathered, it appeared that there were as many new questions as those answered by the survey conducted in the summer of 1994. Therefore, CDC provided resources to the states to conduct a follow-up survey in 1995. Objectives of the Phase II study were:

- Collect samples from all wells testing positive for coliforms or nitrates in the Phase I study.
- Collect samples from 10 percent of the wells that tested negative in the Phase I study.
- At 10 percent of the sample sites, collect well water samples from four neighboring wells.
- At all the above-listed sites, collect a second sample two weeks later.
- Use a refined and expanded questionnaire in order to further define construction problems and help to answer the illness related questions.
- Compile historical water sample data from the state public health laboratories to allow comparison between Phase I and Phase II samples.

It is hoped that the information gathered in the Phase II study will be able to answer questions such as:

- What impact did information provided to owners of wells sampled in the

(continued on page 8)

Public Health Response to Rabies Exposure: Greene County, Missouri, March 1996

William C. Goddard, M.P.A.
Kevin S. Gipson
Barbara Hunter, R.N.
Springfield-Greene County Health Department

F.T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

Every seven minutes, someone in the world dies from rabies. That adds up to over 70,000 rabies deaths per year worldwide; and many believe the true number to be closer to 250,000 deaths. During the past 15 years, the United States has averaged two cases of human rabies per year. Many people accept this fact as, "good fortune, a sign of the times, the way it's suppose to be." The truth of the matter is, it doesn't just happen.

In the 19th century, rabid animals were a threat to Americans on their farms, on the prairies, in the woods and in their communities. Because public health workers have discovered, developed and instituted specific preventive measures for rabies control, the lives of humans and animals are safeguarded. These preventive measures, "cardinal" rules of rabies control, are implemented through city and county health ordinances and reemphasized whenever a county is placed under a rabies alert. They are:

- Dogs and cats should be properly vaccinated by a veterinarian.
- Stray dog and cat populations should be minimized.
- Human contact with stray or wild animals should be avoided.

Rabies is still endemic and present in Missouri, but because of preventive measures, a human case of rabies has not occurred in Missouri since 1959. When these preventive measures are relaxed, Mother Nature allows rabies to rear its ugly head. This was verified recently in a neighborhood just outside the city of Republic, Missouri in Greene County.

Types of Rabies Exposure

Rabies is transmitted only when the virus is introduced into open cuts or wounds in skin or mucous membranes. If there has been no exposure (as described below), postexposure treatment is not necessary. The likelihood of rabies infection varies with the nature and extent of exposure. Two categories of exposure (bite and nonbite) should be considered.

Bite—Any penetration of the skin by teeth constitutes a bite exposure. Bites to the face and hands carry the highest risk, but the site of the bite should not influence the decision to begin treatment.

Nonbite—Scratches, abrasions, open wounds or mucous membranes contaminated with saliva or other potentially infectious material (such as brain tissue) from a rabid animal constitute nonbite exposures. If the material containing the virus is dry, the virus can be considered noninfectious.

Other contact by itself, such as petting a rabid animal and contact with the blood, urine or feces (e.g., guano) of a rabid animal, does not constitute an exposure and is not an indication for prophylaxis.

The neighborhood is a six-home subdivision located on a private cul de sac just outside Republic's city limits. A stray beagle had wandered into the area on or around February 19, 1996. The neighborhood, composed primarily of young married couples with children, accepted the dog without anyone taking on the responsibility of ownership. The children fed and played with the dog daily. On March 4, 1996, a 13 year old girl, who had befriended the dog, rushed to assist it after her father had inadvertently struck the dog with his vehicle. The dog, injured and in pain, bit the child on the arm, thus beginning a series of events that would lead to 18 people receiving rabies post exposure prophylaxis.

The dog was taken to a local veterinary clinic where it was euthanized. Because of the circumstances of the bite, many would have dismissed this casual bite and allowed nature to take its course. Fortunately, a conscientious young veterinarian, guided by his public health training, submitted the head to the State Public Health Laboratory for evaluation for the presence of rabies. The test result was positive and Greene County was placed under a rabies alert by the Missouri Department of Health. A rabies alert encourages awareness and re-enforcement of the cardinal rules of rabies control.

The Springfield-Greene County Health Department notified the bite victim of the positive test result and began its investigation of the case to determine if there were other contacts that might require post exposure prophylaxis. It was determined that only those victims who had experienced saliva contact with the dog would be required to receive post exposure prophylaxis. A town meeting, coordinated by the bite victim's mother and the health department's epidemiologist, was held at the Republic Community Center to assist in obtaining information on individuals exposed. Eighteen contacts were identified as meeting the criteria for post exposure prophylaxis.

A press release was issued by the Springfield-Greene County Health Department

two days after the bite was incurred advising residents of Republic and the surrounding area of the importance of rabies vaccination for their pets. The press release also described the common symptoms exhibited by rabid animals and appealed to the members of the community to report any similar behavior if observed in domestic or wild animals. The press release was broadcasted widely by radio, television and the print media.

The neighborhood in which the incident took place was instructed to closely observe their domestic animals. A litter of puppies that had close contact with the beagle in question was euthanized at the owner's request. None of the puppies from this litter tested positive for rabies. To date, there have been no additional reported cases of animal rabies associated with the case in the Republic area.

During 1995, there were 30 reported cases of animal rabies in Missouri, most of which occurred in the southern portion of the state.[3] Missouri has two reservoirs for rabies, the skunk and the bat. Skunks accounted for 60 percent of the reported cases of rabies in 1995 and bats accounted for 27 percent. These animals are common place in both rural and urban settings, thus increasing the possibility that domestic animals can come in contact with infected animals. These facts underscore the importance of vaccination for all cats and dogs. Communities should also implement rabies and animal control ordinances.

A total of 18 individuals who had been exposed to the dog, including the young girl bitten, had to receive rabies post exposure treatment. The estimated cost associated with this incident totaled approximately $41,000: $26,000 for post exposure prophylaxis treatment with associated provider services and $15,000 for the investigation by public health officials. Control of the stray dog population, and the simple inexpensive rabies vaccination of all dogs, could have prevented this catastrophe. Rabies is a universally fatal infectious disease that can have major socioeconomic and psychological effects on a community. The ability for a community to mobilize a coordinated public health response to a rabies exposure incident such as this is essential and underlines the importance of an effective surveillance and containment strategy.

The veterinarian involved in this situation should be commended for considering the possibility of rabies exposure and submitting the head for testing. The Springfield-Greene County Health Department should be commended for their prompt response and investigative work to prevent cases of human rabies.

Rabies Control Methods in Domestic and Confined Animals

Animal rabies vaccines should be administered only by, or under the direct supervision of, a veterinarian. This is the only way to ensure that a responsible person can be held accountable to assure the public that the animal has been properly vaccinated. Within one month after primary vaccination, a peak rabies antibody titer is reached and the animal can be considered immunized. An animal is currently vaccinated and is considered immunized if it was vaccinated at least 30 days previously, and all vaccinations have been administered in accordance with the current Rabies Compendium*. Regardless of the age at initial vaccination, a second vaccination should be given one year later.

All dogs and cats should be vaccinated against rabies at 3 months of age and revaccinated in accordance with Part II of the Rabies Compendium*.

Ferrets may be vaccinated against rabies at 3 months of age and revaccinated in accordance with Part II of the Rabies Compendium*.

*National Association of State Public Health Veterinarians, Inc. Compendium of Animal Rabies Control, 1995.

Center for Health Information Management and Epidemiology

A new center in the Director's Office of the Department of Health was developed on July 1, 1996. The new center is called the Center for Health Information Management and Epidemiology (CHIME) and is headed by Garland Land, M.P.H. CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. This reorganizational change moved the Office of Epidemiology from the Division of Environmental Health and Epidemiology into the new center along with the following bureaus from the former Division of Health Resources: Bureau of Health Resources Statistics, Bureau of Health Data Analysis, Bureau of Health Services Statistics, Bureau of Health Systems Research and Development and Bureau of Vital Records, and the Office of Information Systems .

The functions of the new center will relate to core public health functions in the following ways:

- Develop department data system standards and provide a user friendly database.
- Analyze, display and interpret data sets.
- Inventory and explore data needs and develop systems to fill gaps.
- Consult with programs to develop and evaluate surveillance systems.
- Provide a medically and scientifically sound set of health-related information

(continued on page 16)

Caring Communities

Dave Carson, M.P.H.
Center for Local Public Health Services

Caring Communities is the inter-agency systems reform effort of five state agencies. Caring Communities is reforming systems which serve the children and families within this state so that better outcomes are achieved. Doing business differently is not an easy task. It takes everyone's participation to bring about needed change.

The five state agencies participating in Caring Communities are: Labor and Industrial Relations, Social Services, Health, Education and Mental Health. They are looking for better ways to serve the children and families of Missouri by reviewing "best practices" intra- and inter-departmentally. In addition, Caring Communities are encouraged to partner with the state agencies to plan the best strategies to address pressing issues. Through Community Partnerships, state and local representatives, business leaders, parents and others engage in candid dialogue surrounding the issues affecting children and families.

Caring Communities' sites prioritize needs based upon an assessment of six core areas:

- parents working and children safe in their families
- families safe in their communities
- children ready to enter school
- children and families that are healthy
- children and youth succeeding in school
- youth ready to enter the work force and become productive citizens.

In the ongoing planning and assessment of community needs, Caring Communities have been given a list of top Department of Health initiatives to consider as possible priorities in their area. This list includes:

- decrease the rate of teen pregnancy
- decrease the rate of smoking
- increase the immunization rate of children ages 0–2
- decrease the rate of low birth weight babies
- decrease the level of inadequate prenatal care
- decrease the incidence of accidental deaths
- decrease the rate of teenage smoking
- decrease the hospitalization rate for preventable conditions
- decrease the number of uninsured
- decrease the incidence of vaccine-preventable diseases
- increase the educational level of women delivering live births.

Currently there are seven Caring Communities, which are located in the following locations: Cape Girardeau, Columbia/Boone County, Springfield/Greene County, St. Joseph/Buchanan County, Knox and Schuyler counties, Kansas City, and St. Louis. In addition, there are six Community Collaboratives which are in the planning stages. They include: Jasper and Newton counties, Phelps County, Pettis County, Jefferson County, six Bootheel counties (Butler, Dunklin, Mississippi, New Madrid, Pemiscot and Ripley) and Marion County.

If you live in one of these communities, you are encouraged to get involved with Caring Communities. Your input will be very valuable as Caring Communities move forward to improve outcomes for children and families.

If you would like more information about Caring Communities, please contact Dave Carson at (573) 751-6170.

On-Site Sewage Law

(continued from page 3)
the least expensive, faster and more accurate of the two tests. Only 25 people in Missouri are listed as soil scientists, which makes the soil morphology evaluation test less available than the percolation test.

With the cooperation of installers, homebuilders, lending institutions, realtors, local governments and homeowners, effective and properly functioning on-site sewage systems can become the norm for outstate Missouri and the precious resource of groundwater and the protection of public health can be better assured.

Further information or copies of the on-site sewage laws and rules may be obtained from your local health department or by contacting the Missouri Department of Health, Bureau of Community Environmental Health, P. O. Box 570, Jefferson City, Missouri, 65102-0570, Ph: (573) 751-6095 or FAX: (573) 526-6946.

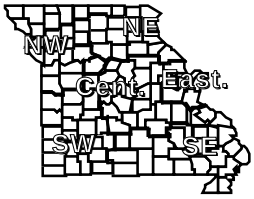
Well Water Survey

(continued from page 5)
Phase I study have on their water quality a year later?

- If a well tests positive or negative today, will it still be that way in two weeks?
- Does the quality of one's well water represent the quality of a neighbor's well water?
- What risk of illness is associated with drinking poor quality water?

With the volume of information gathered in the Phase II study, analysis is ongoing at CDC. Results will be reported promptly when they are made available by CDC.

If you have questions about sampling your private well water, contact your local county health agency or the Bureau of Community Environmental Health, Missouri Department of Health, P.O. Box 570, Jefferson City, MO 65102, Ph: (573) 751-6095.



Missouri Department of Health
Division of Environmental Health and Epidemiology
QUARTERLY REPORT

Reporting Period *
April - June, 1996

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	3 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1996	1995	FOR 1996	FOR 1995	5 YR MEDIAN
Vaccine Preventable Dis.																
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	4	0	6	6
Hib Other Invasive	1	0	0	0	0	0		0	0	0	0	1	4	5	10	25
Influenza	1	1	3	2	1	1		1	0	10	0	20	46	113	302	163
Measles	0	0	2	0	0	0		0	0	0	0	2	0	2	1	1
Mumps	0	0	0	1	0	0		0	0	0	0	1	10	1	17	22
Pertussis	1	0	0	0	1	1		7	3	0	0	13	13	16	17	24
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	0
Viral Hepatitis																
A	54	2	37	18	84	10		26	1	6	12	250	411	485	607	386
B	4	0	1	3	7	4		18	7	5	7	56	107	119	221	233
Non A - Non B	3	0	0	2	2	0		1	0	2	1	11	5	20	11	14
Unspecified	0	0	0	0	0	0		0	0	0	0	0	1	0	1	8
Meningitis																
Aseptic	9	2	1	3	2	1		2	0	3	2	25	47	48	65	65
Meningococcal	0	0	2	0	1	0		2	2	1	0	8	15	39	25	25
Enteric Infections																
Campylobacter	11	7	14	21	10	19		10	5	46	12	155	182	218	268	260
Salmonella	13	2	21	12	12	3		10	2	22	12	109	107	204	196	196
Shigella	13	12	16	9	3	6		2	1	8	3	73	286	214	481	313
Typhoid Fever	0	0	0	0	0	1		0	0	0	0	1	0	1	1	1
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	0	0	0	0	3	10	6	12
Giardiasis	16	7	12	10	10	6		6	4	24	8	103	116	274	235	248
Sexually Transmitted Dis.																
AIDS	22	2	10	4	4	7	8	39	62	49	5	212	177	381	332	148
Gonorrhea	59	24	98	108	67	29		494	721	376		1976	2577	4193	5730	2933
Prim. & Sec. syphilis	0	0	0	3	1	0		3	31	12		50	173	143	346	255
Tuberculosis																
Extrapulmonary	0	0	1	2	0	0	0	1	1	2	1	8	10	12	20	16
Pulmonary	1	0	4	6	1	2	0	10	13	4	7	48	52	77	93	93
Zoonotic																
Psittacosis	0	0	0	0	1	0		0	0	0	0	1	0	1	0	0
Rabies (Animal)	1	0	0	3	1	0		0	0	0	0	5	9	13	19	10
Rocky Mtn. Sp. Fever	1	0	0	3	2	1		0	0	0	0	7	5	8	6	6
Tularemia	0	0	1	1	1	0		0	0	0	0	3	9	3	10	10

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

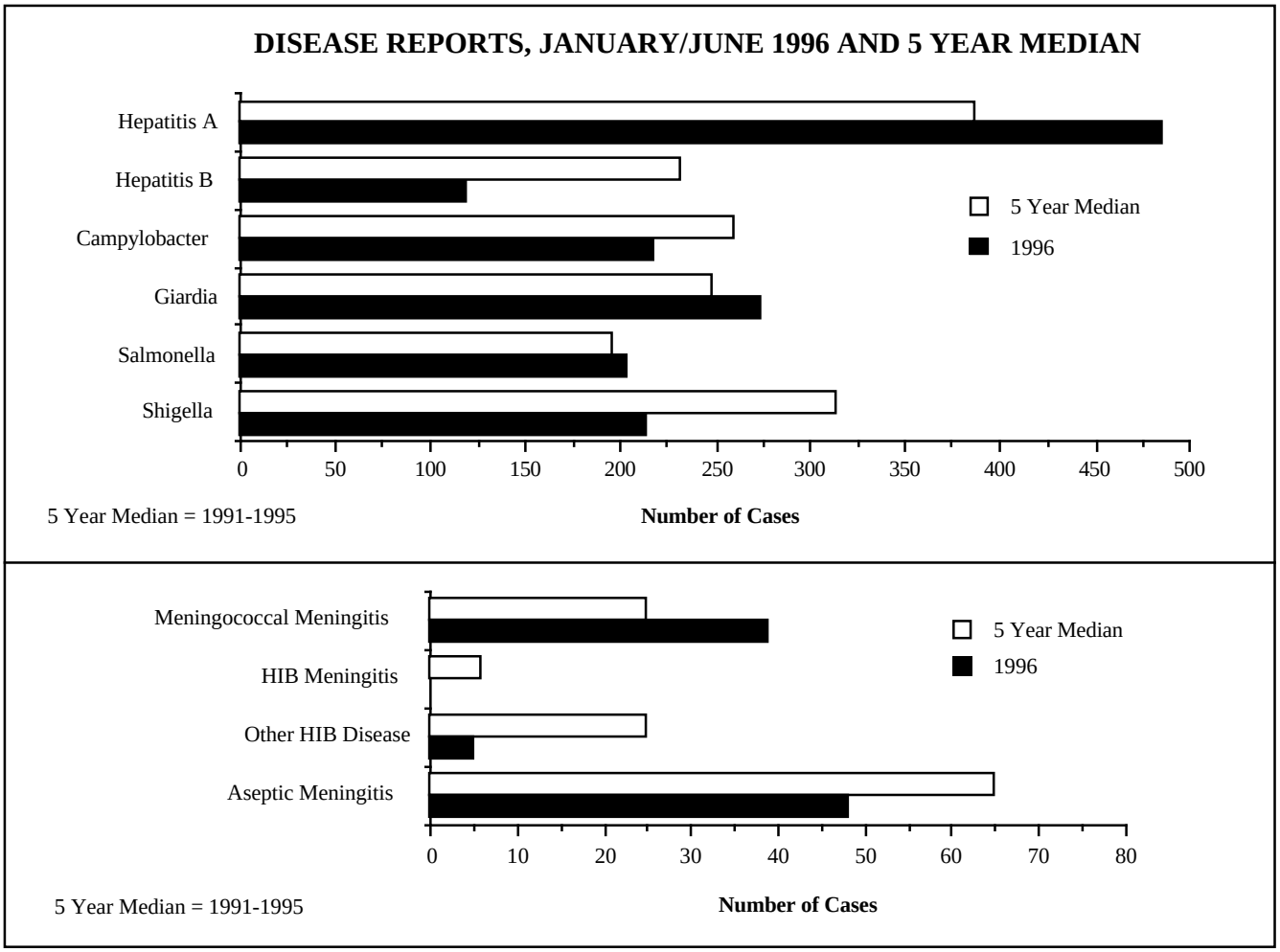
Anthrax
Botulism
Brucellosis - 1
Chancroid
Cholera
Cryptosporidiosis - 42
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 8
Legionellosis - 2
Leptospirosis
Lymphogranuloma Venereum
Malaria - 4
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

Outbreaks

Foodborne - 5
Waterborne
Nosocomial
Pediculosis
Scabies - 3
Other
Hand Foot and Mouth - 1

*Reporting Period Beginning March 31, Ending June 29, 1996.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.



VIRAL HEPATITIS

The 485 cases of hepatitis A reported during the January/June 1996 time period showed a decrease of 20.1% from the 607 cases of hepatitis A during January/June 1995. The first half of 1995 saw a large hepatitis A outbreak in the Kansas City area. Hepatitis A rose 25.6% from the five year six month median of 386 cases. Hepatitis B cases fell by 46.2% for the six month period, from 221 in 1995 to 119 in 1996. This trend continues from 1994-1995 and may be associated with a reduction in certain sexually transmitted diseases. Hepatitis B is 48.9% below the five year six month median for January/June of 233 cases.

ENTERICS

Campylobacter fell by 18.7% during the monthly time period, from 268 cases in 1995 to 218 cases in 1996. It also fell 16.2% from the five year median of 260 cases. Salmonella increased slightly 4.1% from 196 cases in 1995 to 204 cases in 1996. The five year median is 196 cases. Shigellosis decreased by 55.5% from 481 cases in 1995 to 214 cases in 1996. It was 31.6% below the five year median of 313 cases.

PARASITES

Giardiasis increased by 16.6% from 235 cases during the 1995 monthly period to 274 in 1996. It increased by 10.5% from the five year median of 248 cases.

MENINGITIS

Aseptic meningitis decreased by 26.2% from 65 cases in 1995 to 48 cases in the 1996. The five year median is 65 cases. Meningococcal meningitis rose by 56.0% from 25 cases in 1995 to 39 cases in 1996. The five year median is 25 cases.

HIB DISEASE

No cases of Hib meningitis were reported for the period in 1996 and six cases were reported in 1995. It is a decrease of 100.0% from last years six month time period and the five year median of 6 cases. Other invasive Hib disease fell from 10 cases in 1995 to 5 cases in 1996, a drop of 50.0%. Other invasive Hib disease was made reportable in 1990 and there is now a January/June monthly five year median for other invasive Hib disease. Other invasive Hib disease fell by 80.0% from the monthly five year median of 25 cases.

New Legislation to Help Raise Immunization Rates

Ken Osman
Bureau of Immunization

Ninety-eight percent of school-age children in Missouri, and 95 percent of all children enrolled in licensed child care, are now appropriately immunized.

However, only 71 percent of the state's two-year-olds have received all the necessary immunizations, and as many as 20,300 two-year-olds statewide are not appropriately immunized. Statistics show that 90 percent of all Missouri children begin the recommended series of immunizations during their first five months of life, but an alarmingly large number never complete the series. As a consequence, these children are unprotected against deadly diseases such as rubeola (measles), mumps, diphtheria, tetanus, hepatitis B, rubella, pertussis (whooping cough), polio, varicella (chickenpox) and diseases caused by *Haemophilus influenzae* type b (Hib).

The Department of Health, local health agencies, health care providers, professional associations, private companies and community-based organizations have focused on strategies to increase immunization rates in children from birth to 2 years of age. The objective is to have 90 percent of two-year-olds appropriately immunized by the fall of 1997.

This year, House Bill 904, Missouri Act to Improve Access to Immunization for Children, was passed by the General Assembly on May 2, 1996, was signed into law by Governor Mel Carnahan on July 1, 1996 and became effective August 28, 1996. This legislation is an important component in the strategy to to increase immunization rates and strengthening the public/private immunization partnership. It removes the two major barriers that hinder Missouri children from being appropriately immunized. The important issues addressed in this new legislation are:

- **Parental Delegation:** Parents may delegate in writing permission for another responsible adult to present their child for immunization when they cannot do so personally. "Responsible adult" includes such persons as a grandparent, stepparent, aunt or uncle, adult brother or sister or day care provider.

- **Private Insurance Coverage:** As a standard provision of private, comprehensive, health care coverage offered in Missouri, young children, birth to 5 years of age, can receive routine and necessary childhood immunizations which are not subject to any deductible or co-payment. Immunizations covered are against rubeola (measles), mumps, diphtheria, tetanus, hepatitis B, rubella, pertussis (whooping cough), polio, varicella (chickenpox) and diseases caused by *Haemophilus influenzae* type b (Hib). These covered immunizations, and the manner and frequency of their administration, shall conform to recognized standards of medical practice.

All insurance companies authorized to conduct business in Missouri have been notified by the Department of Insurance that this legislation applies to all new contracts and certificates issued to the residents of this state on or after August 28, 1996. Insurance contracts and certificates which were in existence prior to August 28, 1996 must be brought into compliance no later than the first policy anniversary date on or after August 28, 1996.

Health care providers and parents are encouraged to check each child's immunization status as well as coverage provided by their private insurance policy.

Another part of the legislation focuses on the immunizations required for school attendance. It states that three doses of hepatitis B vaccine shall be required for all students entering kindergarten as of and after the beginning of the 1997–98 school year.

Passage of this legislation by the Missouri General Assembly helps ensure that all children in Missouri have the opportunity to be appropriately immunized and protected against vaccine-preventable diseases.

If you have questions regarding the provisions of this new legislation, please contact the Bureau of Immunization at (573) 751-6133 or your district immunization representative.

"Care-a-van"

Bringing Health Care Closer to Home

Beginning in June, a new mobile health care unit rolled into communities offering area residents easier access to immunizations and nutrition programs. Governor Mel Carnahan launched the new program, "Care-a-van," during a kickoff news conference on May 7, 1996 at the State Capitol.

The Missouri Department of Health and six county health departments are working together to provide health care closer to home. The 36-foot mobile unit will be parked in convenient locations, such as grocery stores or shopping center parking lots, and stay open longer than usual business hours, such as evenings or Saturdays. By taking the "Care-a-van" to local communities, the hope is to reach Missourians who are not receiving these preventive health care services. The project will start in Boone, Callaway, Cole, Maries, Osage and Pulaski counties.

To find out when the "Care-a-van" will arrive in your area or for more information, contact the Department of Health toll-free at 1-888-U-BE-WELL (1 (888) 823-9355).

Recommendations for the Use of Influenza Vaccine, 1996–97

The following is a summary of current recommendations on influenza vaccine from the Advisory Committee on Immunization Practices (ACIP). The complete ACIP statement was published in *Morbidity and Mortality Weekly Report, Recommendations and Reports*, May 3, 1996, Vol. 45, No. RR-5.

Influenza vaccine is strongly recommended for any person 6 months of age or older who is at increased risk for complications of influenza. Members of high risk groups are more likely than the general population to require hospitalization if they become ill with influenza. The following persons are at highest risk. They and their close contacts should be targeted for organized vaccination programs.

- Persons 65 years of age and older.
- Residents of nursing homes and other chronic-care facilities that house persons of any age with chronic medical conditions.
- Adults and children with chronic disorders of the pulmonary and cardiovascular systems, including asthma.
- Adults and children who required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies or immunosuppression (including immunosuppression caused by medications).
- Individuals 6 months to 18 years of age who are receiving long-term aspirin therapy and, therefore, might be at risk for developing Reye syndrome after influenza.

Groups that can transmit influenza to persons at high risk should also be immunized. These groups include:

- Physicians, nurses and other personnel in both hospital and outpatient-care settings;
- Employees of nursing homes and chronic-care facilities who have contact with residents;
- Providers of home care to persons at high risk; and
- Household members (including children) of persons in high-risk groups.

Any person who wishes to reduce the likelihood of becoming ill with influenza should receive the vaccine. Administration of influenza vaccine is considered safe at any stage of pregnancy.

The optimal time for organized vaccination campaigns for persons in high-risk groups is usually the period from mid-October through mid-November. In the United States, influenza activity generally peaks between late December and early March. Administering vaccine too far in advance of the influenza season should be avoided, especially for nursing home residents, because antibody levels may begin to decline within a few months of vaccination.

Influenza vaccine should not be administered to persons known to have anaphylactic hypersensitivity to eggs or to other components of the influenza vaccine. Flu vaccine contains only noninfectious viruses, and cannot cause influenza. Respiratory disease after vaccination represents coincidental illness unrelated to influenza vaccination. The most frequent side effect of vaccination, reported by fewer than one third of vaccinees, is soreness at the injection site. Unlike the 1976 swine influenza vaccine, subsequent vaccines prepared from other virus strains have not been clearly associated with an increased frequency of Guillain-Barré syndrome.

The trivalent influenza vaccine prepared for the 1996–97 season will include A/Texas/36/91-like (H1N1), A/Wuhan/359/95-like (H3N2), and B/Beijing/184/93-like hemagglutinin antigens. For both A/Wuhan/359/95-like and B/Beijing/184/93-like antigens, United States manufacturers will use the antigenically equivalent strains A/Nanchang/933/95 (H3N2) and B/Harbin/07/94 because of their growth properties.

A summary of the 1995–96 influenza season in Missouri can be found on pages 1 and 2 of this issue.

Surveys indicate that less than one-half of the high-risk populations receive influenza vaccine each year.* More effective strategies are needed for delivering vaccine to persons at high risk and to their health-care providers and household contacts. Successful vaccination programs have combined education for health-care workers, publicity and education targeted toward potential recipients, a plan for identifying persons at high risk (usually by medical-record review) and efforts to remove administrative and financial barriers that prevent persons from receiving the vaccine.

Outpatient Clinics and Physicians' Offices

Staff in physicians' offices, clinics, health-maintenance organizations and employee health clinics should be instructed to identify and label the medical records of patients who should receive

*Medicare began paying for influenza vaccine in 1993. However, during that same year in Missouri, Medicare provided reimbursement for this vaccine for less than 35 percent of its beneficiaries. Local health agencies and nursing homes who are not currently Medicare providers may apply, through a simplified application process, for a special provider number which will allow them to receive reimbursement for influenza vaccine given to Medicare beneficiaries. Any questions about this process should be directed to the Bureau of Immunization at (314) 751-6133.

vaccine. Vaccine should be offered during visits beginning in September and throughout the influenza season. The offer of vaccine and its receipt or refusal should be documented in the medical record. Patients in high-risk groups who do not have regularly scheduled visits during the fall should be reminded by mail or telephone of the need for vaccine.

Facilities Providing Episodic or Acute Care

Health-care providers in these settings (e.g., emergency rooms and walk-in clinics) should be familiar with influenza vaccine recommendations. They should offer vaccine to persons in high-risk groups or should provide written information on why, where and how to obtain the vaccine.

Nursing Homes and Other Residential Long-Term-Care Facilities

Vaccination should be routinely provided to all residents of chronic-care facilities with the concurrence of attending physicians rather than by obtaining individual vaccination orders of each patient. Consent for vaccination should be obtained from the resident or a family member at the time of admission to the facility, and all residents should be vaccinated at one time, immediately preceding the influenza season. Residents admitted during the winter months after completion of the vaccination program should be vaccinated when they are admitted.

Acute-Care Hospitals

All persons 65 years of age or older, and younger persons (including children) with high-risk conditions who are hospitalized at any time from September through March should be offered and strongly encouraged to receive influenza vaccine before they are discharged. Household members and others with whom they will have contact should receive written information about why and where to obtain influenza vaccine.

Visiting Nurses and Others Providing Home Care to Persons at High Risk

Nursing care plans should identify patients in high risk groups, and vaccine should be provided in the home if necessary. Caregivers and other persons in the household (including children) should be referred for vaccination.

Health Care Workers

Administrators of all health care facilities should arrange for influenza vaccine to be offered to all personnel before the influenza season. Personnel should be provided with appropriate educational materials and strongly encouraged to receive vaccine. Particular emphasis should be placed on vaccination of persons who care for members of high-risk groups (e.g., staff of intensive care units [including newborn intensive care units], staff of medical/surgical units and employees of nursing home and chronic care facilities). Using a mobile cart to take vaccine to hospital wards or other work sites and making vaccine available during night and weekend work shifts can enhance compliance, as can a follow-up campaign early in the course of a community outbreak.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	May 96	Jun 96	Total YTD
Specimens Tested	10,170	9,716	60,142
Initial (percent)	63.0%	62.9%	37,749
Repeat (percent)	37.0%	37.1%	22,393
Specimens: Unsatisfactory	135	134	905
HT Borderline	1,387	1,227	8,177
HT Presumptive	85	61	472
PKU Borderline	9	4	34
PKU Presumptive Positive	1	0	5
GAL Borderline	182	182	705
GAL Presumptive Positive	1	2	7
FAS (Sickle cell trait)	75	88	450
FAC (Hb C trait)	30	17	143
FAX (Hb variant)	9	13	77
FS (Sickle cell disease)	2	0	12
FSC (Sickle C disease)	0	1	5
FC (Hb C disease)	0	0	1

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

"Danger: Lead!"
A Report by the Missouri Commission on Lead Poisoning

Lorena Anderson
Bureau of Environmental Epidemiology

The Missouri Commission on Lead Poisoning, comprised of 21 members from a diversity of professions and experience, has completed its report entitled *"Danger: Lead!."* This report, containing strategies to end childhood lead poisoning, will be submitted to the Governor and General Assembly. The commission, even with its diversity, had a common dedication and commitment to protecting Missouri's children from exposure to lead hazards.

Childhood Lead Poisoning: The Issue

Since each commission member came to the meetings with varying degrees of knowledge about childhood lead poisoning, the first task was to have all members develop an equal understanding of childhood lead poisoning. The history of societal lead use and current trends regarding childhood lead poisoning were among some of the issues discussed.

The history of lead includes widespread use in housing and food packaging. Lead was also used in gasoline and water-delivery systems, as well as certain manufacturing processes. Most of these dispersive uses of lead have been eliminated nationwide. However, lead still poses a threat to our most vulnerable citizens—children.

The primary sources of lead are lead-based paint and lead-contaminated dust. Most often these sources are found in older homes that have not been maintained. Other sources of lead include old pipes made of lead or containing lead solder, hobbies using lead such as stained glass and fishing sinkers, and refuse from past lead mining operations. All these factors have resulted in serious problems of lead poisoning in Missouri. In 1995, 46,348 blood tests were conducted for children less than 6 years of age. Of these tests, 8,781 (19%) showed elevated blood-lead levels ≥10 μg/dL.

Lead poisoning occurs when lead is ingested or inhaled into the body. Children are affected more seriously by exposure to lead because their nervous systems and internal organs are developing during the critical first six years. The effects of lead in children may range from subtle changes in behavior and loss of some capabilities associated with intelligence to convulsions and death as blood-lead levels increase.

The effects of lead poisoning in a child could ripple beyond the individual child and his/her family. The Commission on Lead Poisoning recognizes that: "The loss of one child's potential for learning and earning, when extended among many of Missouri's youngest citizens, will impact the productivity of the entire state. In addition to lost productivity, the quality of life is diminished for individuals who suffer from reduced intelligence due to lead poisoning. Therefore, primary prevention and early identification of lead poisoning increases the chance that Missouri's children will reach their full potential—emotionally, physically and intellectually."

The Commission's Mission

The mission of the Commission on Lead Poisoning states: "The Missouri Commission on Lead Poisoning recognizes the contributions children will make in the future and the importance their overall wellness plays in protecting children. The commission further recognizes that excessive lead in our environment is a poison which threatens the mental and physical health and safety of our children. The Missouri Commission on Lead Poisoning will provide leadership and encourage all Missourians to prevent and eliminate childhood lead poisoning by:

- Reducing lead contamination in Missouri's environment.
- Educating the public about the dangers of lead poisoning.
- Instituting preventive measures so Missouri's children are not lead poisoned.
- Relegating the dangers of lead poisoning to history books."

The Commission's Report

Section 701.302, RSMO mandates the Commmission on Lead Poisoning to submit a formal report to the Governor and General Assembly containing recommendations on the prevention and eventual elimination of childhood lead poisoning. After two years of assessing the problems associated with lead in Missouri, meetings of the full commission with community involvement, and a number of working groups, the commission has completed its report entitled, *"Danger: Lead!."* This report contains short- and long-term recommendations targeted towards the elimination of childhood lead poisoning in the state of Missouri.

The commission members worked to reach a consensus on these recommendations for dealing with the complex issue of lead poisoning. Despite the diversity of interests, backgrounds and perspectives, members of the commission overcame their often competing interests and reached broad agreement on a comprehensive, health-protective, cost-effective and feasible approach to preventing childhood lead poisoning in Missouri. At the same time, commission members recognized the need to set priorities, to ensure continued availability of affordable housing and to address constraints faced by the private sector. The commission will rely on education, private sector agencies and government regulation and enforcement to ultimately

achieve the elimination of childhood lead poisoning in Missouri.

The recommendations contained in the commission's report are separated into four major sections: Reduction of Exposure, Public Education, Medical Management and Financial Considerations.

Reduction of Exposure

Two subsections focus on reduction of exposure:

- **Housing and Other Buildings:** This subsection contains information and recommendations on risk reduction, risk assessment, disclosure of hazards, occupant relocation vs. occupant room relocation, policy for schools and daycare centers, education, and do-it-yourselfers and commercial contractors.

- **Environmental/Waste Management:** This subsection includes information and advisements on lead in dust, lead in soil, lead in water, airborne lead and disposal of lead-based paint residues.

Public Education

This section stresses primary prevention through the use of educational campaigns and environmental interventions. Partial solutions include increasing the awareness of lead hazards for various individuals including property owners, renters, lead inspectors, maintenance personnel, lead abatement contractors, parents, do-it-yourselfers, health-care providers, teachers, day-care providers, local officials, real-estate professionals, insurance agents, non-profit housing and community-development corporation and others.

Medical Management

Information in this section includes statewide Missouri screening data from 1995 and health effects of lead poisoning in children. Emphasis is placed on primary prevention, prompt treatment of children with elevated blood-lead levels and the elimination of exposure sources. Recommendations are included on screening, case management, education and data gathering.

Financial Considerations

This section includes information and recommendations concerning financial issues in regards to reduction of exposure, education, medical management and insurance and liability issues. It is emphasized that "only with widespread support can we assure a safe and healthy life for Missouri's youngest and most vulnerable citizens."

The Commission on Lead Poisoning states that the "recommendations contained in its report will require the support, resources and cooperation of the Governor, the Missouri General Assembly, public agencies and private organizations. Only through cooperative efforts can we provide a lead-safe environment, improve the health of today's children and assure the welfare of future generations."

For further information on the Department of Health's Childhood Lead Poisoning Prevention Program or to obtain a copy of the Commission on Lead Poisoning's report, *"Danger: Lead!,"* call (800) 575-9267 or (573) 526-4911.

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The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

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Center for Health Information Management and Epidemiology

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for the guidance of public health and preventive medicine practice and the education of the general public.

- Disseminate health information and policy through brochures, news releases, newsletters, reports and manuals in printed and electronic format.
- Systematically evaluate epidemiology capacity, function and impact of department programs.
- Participate in the investigation and control of epidemics by providing technical assistance.

The Office of Epidemiology was created in 1991 with the following mission: to investigate and assist others to investigate public health issues in a scientifically sound and epidemiologically based manner which will result in the development of appropriate policies and/or interventions based on the finding. Since its creation, the office has primarily focused its efforts in the area of infectious diseases and environmental health, including disaster management. Placement of the Office of Epidemiology in the new center will encourage the focus of the entire Department of Health on the importance of epidemiology in program management and facilitate the use of epidemiologic methods in all divisions and programs.

The Office of Epidemiology will continue publication of the *Missouri Epidemiologist* newsletter and hopes to include articles relating to a broader range of public health topics in future issues.

The statistical units of CHIME collect, analyze and distribute health-related information which promotes the better understanding of health problems and needs in Missouri, as well as spotlighting improvements and progress achieved in the general health status of Missourians. Other health statistics responsibilities include monitoring the labor pool of selected health professions in the state and monitoring the number, staffing and utilization of hospitals and other health facilities. Data generated by the center aid and guide the planning, development and evaluation of programs and services of the Department of Health as well as the health-related activities of other agencies, institutions and organizations. CHIME staff prepare, edit and publish *Monthly Vital Statistics*, *Missouri Vital Statistics*, *Missouri Population Estimates*, *Missouri Health Manpower*, *Missouri Hospital Profiles* and *Missouri Nursing Homes/RCF Profiles*, as well as special reports based on vital statistics, health manpower, health facilities, hospital discharges and other reports for the department. CHIME also publishes consumer guides pertaining to the costs and quality of hospitals and ambulatory surgical centers in the state.

Missouri EPIDEMIOLOGIST

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Cryptosporidiosis

Bureau of Communicable Disease Control
Office of Epidemiology

Cryptosporidium parvum is a zoonotic protozoa which can cause disease in both immunocompetent and immunocompromised persons. In the former, disease usually manifests as a self-limited diarrheal illness; asymptomatic infections are common. In individuals with impaired immune systems, such as AIDS patients, the disease can be severe and chronic, with voluminous watery diarrhea and weight loss.

Oocysts constitute the infectious stage of *Cryptosporidium*. They appear in the stool at the onset of symptoms and continue to be excreted for several weeks after symptoms resolve. (Persons with asymptomatic infection can also excrete infectious oocysts.) Outside the body, oocysts may remain viable for two to six months in a moist environment, and they are highly resistant to chemical disinfectants used in the treatment of drinking water.

The organism can be transmitted from person-to-person and from animal-to-person, as well as through ingestion of contaminated water or food, and by contact with fecally-contaminated environmental surfaces. Outbreaks of cryptosporidiosis have occurred in both immunocompetent and immunocompromised persons, and some of these outbreaks have been linked to contamination of drinking water. All medical providers should have knowledge of this important emerging pathogen and the potential for its occurrence in their patients, and they should be prepared to answer questions on cryptosporidiosis which their patients may raise. In addition, those caring for immunocompromised persons should be able to provide specific information on how the risk of exposure to *C. parvum* can be minimized.

The Information Collection Rule

In coming months, there will likely be increased interest in cryptosporidiosis as a result of the implementation of the Environmental Protection Agency's (EPA's) Information Collection Rule (ICR). This rule requires public water

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THE ENVIRONMENTAL PROTECTION AGENCY'S INFORMATION COLLECTION RULE

The final Information Collection Rule (ICR) was published in the *Federal Register* on May 14, 1996. The ICR requires large public water systems to collect information on the presence and levels of microbial contamination and disinfection byproducts, and also on the effectiveness of various treatment technologies to reduce those levels.

With regard to microbial monitoring, the ICR will require utilities to monitor for representative bacteria, viruses, and protozoa over an 18-month period. These data are needed to develop national occurrence estimates of the presence and levels of microbial contamination in water entering water treatment plants.

Results from the rule will be used to evaluate how to modify the current regulation on microbial contamination and, in addition, to determine the need for, and content of, longer-term rules. About 500 utilities [nationwide] are expected to be involved in the data collection effort, including four in Missouri (Kansas City, St. Louis City, St. Louis County and Springfield).

Source: *Information Collection Rule: Summary for the Public.* United States Environmental Protection Agency, Office of Water, May 1996

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systems that serve more than 100,000 persons, and use surface water as their source, to expand their testing of source and finished water during an 18-month period beginning in February 1997. This will include required testing for *Cryptosporidium*. EPA will directly administer the ICR in Missouri, where the participating public water systems will include Kansas City, Springfield City Utilities, the City of St. Louis, and the St. Louis County Water Company. Test results will be made available to the public.

According to EPA, *Cryptosporidium* has been found in nearly all surface waters that have been tested nationwide. As water systems monitor for this organism, the likelihood exists that it will be detected occasionally at low levels in finished water derived from surface water sources. *Cryptosporidium* oocysts are very resistant to disinfection, and even a well-operated water system cannot ensure that drinking water will be completely free of this parasite. However, should low levels of oocysts be found in a community's finished water, the meaning of this finding for the health of persons who utilize the water remains unclear. As Juranek points out in the following article:

> The health risk (especially for immuno-compromised persons) associated with consumption of (filtered or unfiltered) public drinking water contaminated with small numbers of *C. parvum* oocysts is unknown. Although researchers are able to recover small numbers of oocysts from treated drinking water, current laboratory methods do not enable them to determine if these oocysts are viable or infectious. Moreover, it is not known if the number of oocysts present in drinking water constitutes a sufficient dose to cause illness in humans, whether immunosuppressed persons are more susceptible to lower doses of oocysts than are immunocompetent persons, or if there are strains of *C. parvum* that vary in infectious dose and virulence.

The Missouri Department of Health (DOH) and the Missouri Department of Natural Resources (DNR), together with officials from the four Missouri cities and counties where expanded testing of public water systems will be implemented, are developing response protocols which will be utilized should the results of this testing indicate the potential presence of *Cryptosporidium* in the finished water supply. Use of these protocols will mean that necessary and appropriate steps can be taken to ensure the safety of all persons who may ingest this water.

Laboratory Diagnosis of *Cryptosporidium*

Several laboratory methods for diagnosing infection with *Cryptosporidium* are currently available:

1. **Identification of oocysts in fecal smears**

- Infection with *Cryptosporidium* is not easily detected unless looked for specifically. Fecal specimens should be collected as early in the course of illness as possible using an intestinal parasite collection kit (O&P kit) which contains two different preservatives, PVA and formalin. Specimens should be placed in both preservatives. Specimens may be shipped at room temperature.

- Specimens should be sent to the State Public Health Laboratory for testing (use the Lab-27 form "Parasitology Examinations Request."). Positive results are usually reported by the State Laboratory within 24 hours of receiving the specimen.

- **A routine O&P examination will <u>not</u> detect *Cryptosporidium*; therefore, whenever cryptosporidiosis is suspected, one must write "Crypto" on the form.**

- The number of oocysts present in the feces may vary. If stools are watery or diarrheal, there is a good chance that *Cryptosporidium* oocysts will be detected if they are present. However, as the stool becomes formed, there will be less oocysts excreted. Therefore, it is recommended that, if cryptosporidiosis is suspected and the initial stool specimen is negative, two additional specimens be collected 24 hours apart, <u>OR</u> one may initially request that three (3) stool specimens be collected on three (3) consecutive days to help assure a diagnosis. At a minimum, at least two (2) fecal samples should be examined before an individual can be considered negative.

2. **Identification of life cycle stages of the parasites in intestinal biopsy sections**

3. **Immunologically based tests (e.g., ELISA or DFA) to detect *Cryptosporidium* in fecal specimens and tissue.**

Serologic assays for *Cryptosporidium* infection are also available and may be helpful in epidemiologic studies. However, it is not known when the antibody appears and how long it lasts after infection. The State Public Health Laboratory does not do serologic antibody testing or immunodiagnostic testing.

Testing for *Cryptosporidium* Oocysts in Water

Methods for detecting *Cryptosporidium* oocysts in water supplies and finished drinking water are of limited value as they do not effectively differentiate viable from non-viable oocysts, and they are unable to accurately differentiate *C. parvum* from those species of *Cryptosporidium* which are non-infectious to humans. In addition, the reliability of such testing can be affected by the turbidity of the water, the techniques involved are labor intensive, and the level of laboratory expertise may affect the results. Consequently, in most instances, water supplies will not be tested for *Cryptosporidium*.

If one suspects the water supply as the source of *Cryptosporidium* infection, it can be tested for coliform bacteria, which are a general indicator of the safety of the water. If coliform bacteria are de-

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Cryptosporidiosis: Sources of Infection and Guidelines for Prevention

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This article originally appeared in Clinical Infectious Diseases 1995;21 (Suppl 1)S57-61, and is used here by permission of the author. Note that the prevention recommendations contrained in this article are meant to apply to immunocompromised persons (such as those with HIV infection), and not to individuals with intact immune systems.

***Cryptosporidium parvum* is an important emerging pathogen in the United States and a cause of severe, life-threatening disease in patients with AIDS. No safe and effective form of specific treatment for cryptosporidiosis has been identified to date. The parasite is transmitted by ingestion of oocysts excreted in the feces of infected humans or animals. The infection can therefore be transmitted from person-to-person, through ingestion of contaminated water (drinking water and water used for recreational purposes) or food, from animal to person, or by contact with fecally contaminated environmental surfaces. Outbreaks associated with all of these modes of transmission have been documented. Patients with human immunodeficiency virus infection should be made more aware of the many ways that *Cryptosporidium* species are transmitted, and they should be given guidance on how to reduce their risk of exposure. This article summarizes existing data on the various modes of transmission. It includes an in-depth look at waterborne transmission because as more research data are made available to the public, physicians will increasingly be asked by patients about the importance of this source of infection compared with other sources of infection.**

Cryptosporidium parvum has been recognized as a human pathogen since 1976. From 1976 to 1982, the disease was rarely reported and primarily occurred in immunocompromised persons. In 1982, the number of reported cases began to increase dramatically as part of the AIDS epidemic. Initially, the increase was limited to immunocompromised persons; however, with the aid of newly developed laboratory diagnostic techniques, outbreaks in immunocompetent persons began to be recognized. In immunocompetent persons, cryptosporidiosis is manifested as an acute, self-limiting diarrheal illness lasting 7 to 14 days and it is often accompanied by nausea, abdominal cramps, and low-grade fever. In patients with AIDS, cryptosporidiosis is generally chronic and more severe than in immunocompetent persons; the voluminous watery diarrhea is often debilitating and may be accompanied by severe abdominal cramps, weight loss, anorexia, malaise, and low-grade fever.[1]

No safe and effective form of treatment for cryptosporidiosis has been identified to date. On the basis of initial human treatment trials, several drugs have been reported to decrease the frequency or volume of stool production in some patients. However, to date, none of these initially "promising" drugs have lived up to expectations when subjected to larger, controlled studies or to widespread use by physicians in clinical practice.

Incidence of Cryptosporidiosis

Cryptosporidiosis is among the most common causes of diarrhea in patients with AIDS in the United States. About 2.2 percent of all patients whose cases of AIDS are reported to Centers for Disease Control and Prevention (CDC) have cryptosporidiosis as their AIDS-defining illness; 3.5 percent of children whose cases of AIDS are reported to the CDC have cryptosporidiosis. Hospital-based studies indicate that cryptosporidiosis is diagnosed in 10–20 percent of patients with AIDS who have diarrhea.[2-6] Because diarrhea occurs in about half of all patients with AIDS each year[2,7], it is estimated that the annual rate of cryptosporidial infection among all patients with AIDS may approach 5–10 percent.

Cryptosporidiosis can occur at any time in the course of HIV infection. However, severe and persistent disease correlates well with CD4 counts of less than 180 cells/mm^3. In one study, only 5 (13%) of 39 patients infected with *C. parvum* and with CD4 counts of less than 180 cells/mm^3 had self-limiting disease, whereas all 8 patients with CD4 counts of greater than 180 cells/mm^3 had infections that cleared and did not relapse during a follow-up period of 1-24 months.[8]

Source of Infection and Risk Factors

Cryptosporidium species are transmitted by ingestion of oocysts excreted in the feces of infected humans or animals. Cryptosporidial infection can therefore be transmitted from person-to-person, through ingestion of fecally contaminated water or food, from animal to person, or by contact with fecally contaminated environmental surfaces.

Transmission via Water and Food

Six well-documented outbreaks of cryptosporidiosis attributed to drinking water have been recognized in the United States, including an outbreak in Milwaukee in 1993 that affected over 400,000 persons.[9-15] The source of drinking water used by utilities in these outbreaks included surface water (lakes, rivers, streams), well water, and spring

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water. Several outbreaks have also been associated with swimming pools and amusement park wave pools or water slides.[12,16-19]

There is considerable circumstantial evidence that low level (non-epidemic) transmission of *Cryptosporidium* species through drinking water may be occurring throughout the United States. Recent studies indicate that *Cryptosporidium* oocysts are present in 65–97 percent of surface waters (rivers, lakes, etc.) tested throughout the country.[20-23] Because *Cryptosporidium* species are highly resistant to chemical disinfectants used in the treatment of drinking water, physical removal of the parasite from contaminated water by filtration is an important component of the water treatment process. However, a filtration system, especially one that is not well maintained and operated, may not afford absolute protection. All waterborne outbreaks of cryptosporidiosis detected to date have occurred in communities where water utilities met state and federal standards for acceptable quality of drinking water, and in all three of the outbreaks that involved surface water supplies, a filtration system had been used. Data from the outbreaks suggest that compliance of utility companies with state and federal standards for water treatment may not be adequate to protect citizens from waterborne cryptosporidiosis. Moreover, recent surveys for the occurrence of *Cryptosporidium* oocysts in fully treated (disinfected and filtered) municipal water demonstrate that small numbers of oocysts were able to breach filters and were present in tap water in 27–54 percent of communities evaluated.[23,24]

Twenty three million Americans reside in communities that do not filter municipal drinking water that comes from surface sources.[25] These communities include some of America's largest cities, which have substantial numbers of patients with HIV infection or AIDS, (e.g., New York, Boston, Seattle, Portland and San Francisco). Small numbers of *Cryptosporidium* oocysts have also been intermittently found in the drinking water in these cities. However, none of the cities with filtered water or with unfiltered drinking water where small numbers of oocysts have been detected have had a recognizable outbreak of cryptosporidiosis. While low level transmission could be occurring as a result of such low concentrations of oocysts, there are no data to date that document such an event. The absence of a treatment barrier for *Cryptosporidium* species in communities that do not use a filtration system could result in significant transmission if the source of the drinking water were to become heavily contaminated with this organism.

The health risk (especially for immunocompromised persons) associated with consumption of (filtered or unfiltered) public drinking water contaminated with small numbers of *C. parvum* oocysts is unknown. Although researchers are able to recover small numbers of oocysts from treated drinking water, current laboratory methods do not enable them to determine if these oocysts are viable or infectious. Moreover, it is not known if the number of oocysts present in drinking water constitutes a sufficient dose to cause illness in humans, whether immunosuppressed persons are more susceptible to lower doses of oocysts than are immunocompetent persons, or if there are strains of *C. parvum* that vary in infectious dose and virulence. Dose response data are currently available for only one isolate of *C. parvum* that was evaluated in healthy volunteers. In this study, the 50 percent infectious dose (ID50) was estimated to be 132 oocysts.[26,26a]

Food contaminated with feces from infected persons or animals has always been considered to be a theoretical risk factor for cryptosporidiosis. A recent outbreak of cryptosporidiosis in children who drank fresh-pressed apple cider contaminated by animal feces at a county fair in Maine provides the first documentation of this mode of transmission.[27] Although oocysts do not survive cooking, infected food handlers may unwittingly transmit the infection by fecal contamination of beverages, green salads, or other foods that are not cooked or heated after handling.

Animal-to-Person Transmission

C. parvum is capable of infecting all species of mammals including humans.[28,29] In animals, cryptosporidiosis almost exclusively occurs in newborns. There are no data on the national prevalence of cryptosporidial infection in puppies or kittens in the United States, but in a study in Atlanta, 10 percent of puppies examined at an animal shelter were found infected and shedding oocysts.[30] To date, there have been no confirmed instances of *C. parvum* transmission from infected household pets. Two suspicious episodes have been reported in which an infected cat was found in the house of an immunodeficient person with cryptosporidiosis; in neither instance could the direction of spread be clearly elucidated.[31,32]

Other species of *Cryptosporidium* that infect birds (*C. meleagridis* and *C. baileyi*), rodents (*C. muris*), reptiles (*C. serpentis*), and fish (*C. nasorum*) are not generally considered to be infectious for humans.[33] To date, only one case of human infection with any of these species has been reported[34]; this case occurred in an HIV-infected patient from whom a parasite resembling *C. baileyi* was isolated, but who did not have a pet bird or other specific exposures to birds.

In strong contrast to the weak epidemiological data implicating household pets as sources of cryptosporidiosis in humans, the evidence for *C. parvum* transmission from calves to humans is unequivocal.[35-40] It is estimated that 50 percent of dairy calves shed oocysts and that the parasite is present on more than 90 percent of dairy farms.[41-43] While relatively few patients with AIDS are directly exposed to calves or to premises where calves are raised, the high prevalence of infected calves, especially on dairy farms, raises additional questions about the prudence of drinking unpasteurized milk.

Person-to-Person Transmission

Person-to-person spread of *C. parvum* is believed to be one of the most common modes of transmission. Children still wearing diapers who attend daycare centers are at especially high risk for this form of transmission either through intimate play or because of careless diaper changing practices. Infections acquired by children in the day care setting are often transmitted to care-givers at the facility and to older children and adults who come in contact with the infected child at home.[44] Any sexual practice that brings a person into oral contact with the feces of an infected person is also considered a high-risk for exposure to *Cryptosporidium* species. It is not known how many patients with HIV infection or AIDS acquire cryptosporidiosis by this route of transmission. For patients with HIV infection or AIDS who follow "safer sex" practices, including avoidance of feces, this mode of transmission should be minimal.

Several other types of high-risk exposures include direct contact with feces while caring for an infected person (e.g., bathing, changing soiled bedding, or emptying a bed pan) at home or in a medical facility. Nosocomial infections involving both medical care staff and patients have been reported.[45-50] Hospital staff should observe proper precautions for preventing fecally transmitted disease while caring for patients with cryptosporidiosis.

Prevention of Exposure

The proportion of cases of cryptosporidiosis in HIV-infected persons that can be attributed to each mode of transmission is unknown. Identification of the most common route(s) of transmission and a better understanding of the specific risk factors for exposure that lead to infection would greatly facilitate development of a more targeted prevention strategy. Until such data become available, doing what one can to avoid each of the commonly recognized modes of transmission should reduce the risk of infection. As with many other opportunistic infections for which effective treatment is not available, prevention of infection is the most effective approach to disease control.

It is clear that HIV-infected persons should not drink water directly from lakes or rivers. This includes accidental ingestion of lake or river water while swimming or engaging in other types of recreational water activity. The amount of chlorine and types of filters used in public swimming pools are not adequate to prevent transmission from swimmers infected with *Cryptosporidium* species who can shed oocysts for weeks after symptoms resolve. Patients should be advised that these activities may expose them to *Cryptosporidium* species, especially if the pool is used by young children who might accidentally defecate in the pool. Because HIV-infected patients who have a cryptosporidial infection can reinfect themselves and infect others, they should not use swimming pools that will be used by others. Swimming pools can be disinfected by using high concentrations of chlorine for long periods (e.g., 3 mg/l water for 53 hours or 8 mg/l for 20 hours).

While several municipal waterborne outbreaks of cryptosporidiosis have occurred in the United States, the magnitude of risk for acquiring cryptosporidiosis by drinking municipally treated water in the non-outbreak setting is presently unknown. The risk is likely to vary from city to city depending on the quality of the city's source of water and the quality of water treatment provided. Current risk data are not adequate to recommend that all immunocompromised persons in the United States boil or avoid drinking tap water. However, persons with severely weakened immune systems should be advised that the risk is not zero. Until the health risk associated with small numbers of oocysts commonly found in drinking water is more clearly defined, HIV-infected persons who want to take independent precautions to reduce the risk of waterborne cryptosporidiosis can do so by boiling for one minute all water intended for drinking.[51,51a]

As an alternative to boiling water, certain types of individual or household filters or a high-quality bottled water may provide nearly the same level of protection. While several portable and household filters are capable of removing *Cryptosporidium* oocysts from drinking water, bacterial overgrowth on these filters may pose an additional health risk.[52] Therefore, patients should be advised to carefully follow the manufacturer's instructions for the use and replacement of filters. In addition, since *Cryptosporidium* oocysts are likely to concentrate on the outside of a filter cartridge that has been in use, patients should have someone else change dirty cartridges or they should use gloves if they do it themselves.

When selecting an effective filter one must pay careful attention to label information in order to avoid purchasing one of numerous filters on the market that are not effective against *Cryptosporidium* species. Only microstraining filters that can remove particles 0.1 to 1 micron in size should be considered. Filters in this category that provide the greatest assurance of removal of *Cryptosporidium* species include those that filter water by reverse osmosis, those that have "absolute" 1 micron filters, and those that meet NSF (National Sanitation Foundation) standard #53 for "cyst removal." The "nominal" 1 micron filter rating is not standardized and many filters in this category may not be capable of removing greater than 99 percent of oocysts. Filters that only employ ultraviolate light, activated carbon, or pentiodide impregnated resins are not effective against *Cryptosporidium* species. It should not be assumed that all filters advertised as effective against *Giardia* species are effective against *Cryptosporidium* species.

Many, but not all, brands of bottled water may provide a reasonable alternative to tap water. Patients should be advised that the origin, the microbial quality, and microbial treatment of water before it is bottled vary considerably

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among companies and even among brands of water produced by the same company. Information on the labels of water bottles has not been standardized and often does not provide the consumer with the type of information needed to identify the product with the lowest risk for cryptosporidiosis. As with filters, individuals who want to use bottled water as an alternative to tap water must research and pick their supplier very carefully. In general, bottled water derived from springs or wells is safer than water obtained from rivers and lakes. Bottled water that originates from well-protected underground sources (a well or a spring), that are not subject to intermittent contamination from surface water, and that have been consistently shown to be free of coliform bacteria will not contain oocysts. Since there is no industry labeling standard that reflects this information, patients may have to question vendors directly to obtain information about these points.

Just as in the case of municipal water supplies, the absence of coliform bacteria in the final bottled water product does not provide assurance that the water came from an uncontaminated source or that it has been treated adequately to remove *Cryptosporidium* species. Treatment of water prior to bottling by distillation or reverse osmosis filtration, regardless of the source (well, spring, river, lake), assures the remove of oocysts if they are present. In addition, water that has been passaged through an "absolute" 1 micron or smaller filter, or through a filter labeled as meeting NSF standard #53 for "cyst removal" prior to bottling will provide nearly the same level of protection. Bottlers using "nominal" 1 micronfilters as the only treatment barrier for *Cryptosporidium* species may not be capable of removing greater than 99 percent of oocysts. Companies that use the word "micro-filtration" on the label may or may not be using filters that are effective against *Cryptosporidium* species.

Although ozonation of water has also been shown to kill *Cryptosporidium* oocysts, the appropriate amounts of ozone needed to disinfect water at various temperatures and pHs have not been clearly defined. Bottlers are currently restricted to no more than 0.4 mg of ozone per liter in the final product. This may or may not be an adequate amount to kill *Cryptosporidium* species, depending on the contact time and other water conditions. In general, the amount of ozone needed to kill *Cryptosporidium* species is hundreds of times greater than that needed to kill bacterial contaminants.[33] Treatment of municipal tap water with charcoal to remove the chlorine taste or with short-term exposure to ultraviolet light before bottling offers no additional protection against *Cryptosporidium* species.

The risk of cryptosporidiosis associated with pet ownership is probably small, but it is reasonable to suggest that HIV-infected persons avoid contact with feces of animals. In situations where it is not possible to avoid such contact, e.g., cleaning a cat litter box or removing feces from shoes or other items that may have become contaminated, patients should be instructed to wear disposable gloves. The risk from household pets (dogs and cats) is greatest from exposure to animals younger than 6 months of age and to any animal with diarrhea. Physicians should inform patients that pet ownership may entail a small risk for cryptosporidial infection and should discuss how these risks can be further minimized; it should not be recommended that patients destroy or give away healthy pets with whom they have a strong emotional attachment. Immunosuppressed patients contemplating the acquisition of a new pet should avoid bringing any animal with diarrhea into their household, should avoid purchasing a dog or cat younger than 6 months of age, and should not adopt stray animals found roaming the neighborhood. HIV-infected patients who want to assume the small risk of acquiring a puppy or kitten younger than 6 months of age should be advised to specifically request that their veterinarian examine the animal's stool for *Cryptosporidium* species before the patient has contact with the animal.

Research Priorities

More rapid and sensitive serological and molecular diagnostic techniques for the detection of *Cryptosporidia* in humans and in environmental sources are needed to facilitate epidemiologic studies of cryptosporidiosis. High priority studies include: 1) an assessment of the proportion of cryptosporidial infections attributable to the low numbers of oocysts frequently found in municipal drinking water and 2) the relative risk of acquiring cryptosporidiosis from drinking water versus contact with animals, unsafe sexual practices, and nonsexual household or hospital contacts.

Data from such studies would serve to focus the immunocompromised patient's attention on avoidance of the exposures that would put them at greatest risk. Studies are needed to define the asymptomatic carrier rate for *Cryptosporidium* species in HIV-infected patients who recover from a clinical episode of cryptosporidiosis and who have CD4 cell counts of greater than 200/mm^3. There is also a need to know if such carriers are likely to develop severe cryptosporidiosis when their CD4 count drops below 200 cells/mm^3. Improved laboratory methods are needed to facilitate screening of potential therapeutic agents for infections due to *Cryptosporidium* species. Finally, state and national reporting systems for cases of cryptosporidial infection are needed to better quantify the public health impact of this disease and to identify outbreaks.

References available upon request. Contact the Office of Epidemiology at (573) 751-6128.

Cryptosporidiosis Fact Sheet

What is cryptosporidiosis?

Cryptosporidiosis (krip-toe-spo-rid-e-o-sis) is an illness caused by *Cryptosporidium parvum,* a tiny parasitic organism which can only be seen with a microscope. The disease is often called "crypto."

Is cryptosporidiosis a new disease?

Cryptosporidiosis is not new, but we didn't know it could cause illness in humans until 1976.

How is this parasite spread?

The *Cryptosporidium* parasite is passed in the stool of infected persons and animals. With poor sanitation practices, *Cryptosporidium* organisms from the stool of these infected persons and animals can get into food and water. Infection occurs when the parasite is swallowed by a person. It takes only a few of the *Cryptosporidium* parasites to cause an infection. *Cryptosporidium* infection can be spread from person to person or animal to person by direct contact with infected stool. The parasite can also be spread to others when the infected person does not wash his/her hands properly after using the toilet. If food is not washed after being in soil or water that contains *Cryptosporidium*, the parasite can spread to the person who eats that food. Persons with *Cryptosporidium* infection who are most likely to spread this infection to others include those who:

- have diarrhea,
- cannot control their bowel movement,
- have poor personal hygiene,
- are infants or young children in diapers.

Persons can get cryptosporidiosis by drinking water which contains *Cryptosporidium* parasites. Persons can get cryptosporidiosis by swimming or playing in rivers, streams, springs, lakes, swimming pools or water parks if the *Cryptosporidium* organism is in the water.

Who gets cryptosporidiosis?

Anyone can get cryptosporidiosis. Persons with weakened immune systems who develop cryptosporidiosis are at higher risk of having serious illness which is long-lasting and sometimes even deadly. Persons with weakened immune systems include those receiving cancer chemotherapy, kidney dialysis or steroid therapy, as well as those with Crohn's disease or with AIDS.

What are the symptoms of cryptosporidiosis?

The most common symptom is diarrhea. There may also be abdominal cramps, nausea, fever and loss of appetite. Once in a while, cryptosporidiosis can cause an infection in the gall bladder or in the lung. Some persons infected with cryptosporidiosis may not have any symptoms, but they can still pass the parasite to others. Healthy persons usually have symptoms for two weeks or less. However, symptoms may last as long as 30 days in healthy persons. During this time, infected persons might get better and then get sick again. Persons with weak immune systems may not be able to get rid of the parasite, and may have much more severe and long lasting illness that can include large amounts of watery diarrhea and weight loss.

How do I know if I have cryptosporidiosis?

The stool of the ill person is sent to a laboratory where it is tested.

How soon do symptoms appear?

The symptoms may appear from 1 to 12 days after exposure, but usually within 7 days.

How long can an infected person infect others?

The infected person can infect others throughout the time when he or she is ill, and then for several more weeks after the symptoms disappear. Infected persons who do not have symptoms can also infect others.

Where are the *Cryptosporidium* parasites found?

Cryptosporidium parasites have been found in infected persons (with or without symptoms) and in wild and household animals. Stool from infected animals and humans can get into lakes, streams, rivers, springs and creeks, as well as swimming pools. As a result, water from any of these locations could potentially be a source of infection.

Should an infected person stay home from work, school or day care?

People with diarrhea (infants and young children, for example) **should not** attend day care or other group activities where they can infect others. Persons who handle foods, take care of patients in a hospital or nursing home, or work in a child care center should not work when they **cannot** control their bowels or have diarrhea. These persons may go back to work when the diarrhea stops. However, they should carefully wash their hands for at least 10 seconds with soap and warm water after each visit to the toilet.

How is cryptosporidiosis treated?

There currently is no specific treatment for cryptosporidiosis. Persons with diarrhea should drink plenty of fluids. Medicine used to control diarrhea sometimes helps.

What can be done to prevent getting and spreading cryptosporidiosis?

- Wash hands carefully (at least 10 seconds, using soap and warm water) after toilet visits or changing diapers, and before preparing or eating foods.
- Avoid drinking raw milk.
- Avoid drinking untreated and improperly filtered surface water when camping or when traveling in developing countries unless that water has been boiled for one minute.
- Thoroughly wash fresh fruits and vegetables before eating.
- Wash hands well after working in soil or after being around animals, since both can be sources of infection.
- Carefully dispose of sewage waste so it doesn't go into surface or ground water.
- In persons with weakened immune systems, cryptosporidiosis can be very serious and can even cause death. Persons with a weakened immune system should call their doctor if they develop illness with diarrhea or if they have a possible contact to cryptosporidiosis.

Missouri Department of Health
Bureau of Communicable Disease Control
Ph: (573) 751-6113

Additional information on cryptosporidiosis from the Centers for Disease Control and Prevention can be found on the Internet at http://www.cdc.gov/ncidod/diseases/crypto/crypto.htm.

10/96

You Can Prevent Cryptosporidiosis: A Guide for Persons with HIV/AIDS

Centers for Disease Control and Prevention (CDC)

TEAR OUT FOR DISTRIBUTION TO PATIENTS

What is cryptosporidiosis?

Cryptosporidiosis (krip-toe-spo-rid-e-o-sis) is the disease often called "crypto" caused by a one-celled animal, *Cryptosporidium parvum*, which is too small to be seen without a microscope. Although sometimes people infected with *Cryptosporidium* don't get sick, when they do get sick they can have watery diarrhea, stomach cramps, an upset stomach, or a slight fever. The first symptoms of cryptosporidiosis may appear 2 to 10 days after a person becomes infected. Cryptosporidiosis causes more severe and longer illness in persons with AIDS than in other people.

How does cryptosporidiosis affect someone with a weakened immune system?

In persons with severely weakened immune systems, especially those with AIDS, cryptosporidiosis can be serious, long-lasting and sometimes deadly. If your CD4 cell count is below about 200, you are more likely to have diarrhea and other symptoms for a long time. If your CD4 count is above 200 and you get cryptosporidiosis you may feel better in about one to three weeks, but you might still have the infection and be able to pass it to others even after you feel better. If you are still infected and your CD4 count later drops below 200, the cryptosporidiosis may act up again.

How is cryptosporidiosis spread?

You can get cryptosporidiosis when you put anything in your mouth that has touched the "stool" (that is, bowel movement) of a person or animal with cryptosporidiosis. *Cryptosporidia* are too small to be seen without a microscope by the naked eye. Cryptosporidiosis is not spread in blood. The most common ways you can get cryptosporidiosis are touching your mouth before washing your hands and after touching the stool of infected persons, or touching the stool of infected animals, or touching soil or objects contaminated with stool. You can also get a *Cryptosporidium* infection by drinking water contaminated with stool or eating food contaminated with stool.

What is the treatment for cryptosporidiosis?

Some drugs may reduce the symptoms of cryptosporidiosis, but no drug can cure it. New drugs are being tested. If you think you have cryptosporidiosis, talk about testing and treatment with your health care provider. You can also drink an oral rehydration therapy mix to avoid getting dehydrated. You can buy these mixes at drug stores and sports stores.

How can I prevent cryptosporidiosis?

There are many things that you can do to reduce your risk of getting cryptosporidiosis. The more things you do, the better your chances of avoiding cryptosporidiosis. These actions will also help protect you against other diseases.

1. **Wash your hands.**
   Washing your hands often with soap and water is probably the single most important thing you can do to avoid cryptosporidiosis and other illnesses. Wash your hands well after touching children in diapers; after touching clothing, bedding, or bed pans soiled by someone who has diarrhea; after gardening; any time you touch pets or other animals; and after touching anything that might have had contact with even the smallest amounts of human or animal stool. Even if you wear gloves when you do these activities you will still need to wash well when you finish. Always wash your hands before preparing food to avoid spreading any infections you might have to others. Supervise hand washing by HIV-infected children.

2. **Avoid sex that involves contact with stool.**
   Infected persons may have *Cryptosporidium* on their skin in the genital area, including the thighs and buttocks. However, since you cannot tell if a person has cryptosporidiosis, you may want to take these precautions with any sex partner:

   - don't kiss or lick the genitals or anus
   - wash your hands well after touching your partner's anus or rectal area

   Rimming (licking the anus) is so likely to spread infection that you should avoid it, even if you and your partner wash well before.

3. **Avoid touching farm animals.**
   If you touch a farm animal, particularly a calf, lamb or other young animal, or visit a farm where they are raised, wash your hands well with soap and water before preparing food or putting anything into your mouth. Do not touch the stool of any animal, including any stool you find on your shoes or boots.

4. **Avoid touching the stool of pets.**
   Most pets are safe to keep. However, you should have someone else clean the litter boxes of cats and dispose of the stool of other animals. If someone else cannot help you, use disposable gloves when handling anything that might be contaminated by the stool of pets. Wash your hands after taking off the gloves. The risk of getting cryptosporidiosis is greatest from pets less than 6 months old and animals that have diarrhea. Older animals can also have cryptosporidiosis, but they are less likely to be sick or to pass the disease to humans. If you are getting a puppy or kitten that is less than 6 months old, have your veterinarian test the animal for cryptosporidiosis before bringing it home. Do not adopt a stray animal. If your pet develops diarrhea later, have your veterinarian test it for cryptosporidiosis again. Wash your hands after touching any animal.

5. **Wash and/or cook your food.**
   Vegetables and fruits that may have touched soil or water might be contaminated. Wash vegetables or fruit you will eat uncooked. If you choose to take extra steps to make your water safe (see below for ways to make sure that your water is safe), you should rinse your fruits and vegetables only with a stream of this safe water. You can also peel fruit that you will not cook. Do not eat or drink unpasteurized milk or dairy products. Cooking kills *Cryptosporidium.* Cooked food and processed or packaged foods are probably safe after cooking or processing if they are not handled by an infected person.

6. **Be careful when swimming in lakes, rivers, pools or jacuzzis.**
   Be careful when swimming in lakes, rivers, public pools or jacuzzis because of the risk of swallowing contaminated water. If you do go swimming, don't swallow any water.

7. **Drink safe water.**
   Don't drink water directly from lakes, rivers, streams or springs. You may wish to avoid drinking tap water. Because public water quality and treatment varies in the United States, you should check with your local health department and water utility to see if they have made any recommendations for HIV-infected persons about drinking local tap water. There are three extra measures you may wish to take to ensure that your drinking water is safe: boil your water, filter your water with certain home filters, or drink certain types of bottled water. Processed bubbly drinks in cans or bottles are probably safe also. If you choose to take these extra measures, take them all the time, not just at home. If your local public health office warns you to boil your water, don't drink tap water unless you make it safe. Here are some extra measures you may wish to take to make sure your water is safe:

A. **Boiling water:** Boiling is the best extra measure you may wish to take to be sure that your water is free of *Cryptosporidium* and any other germs. You yourself can see that the water was boiled and that it was stored safely. Bring your water to a rolling boil and let it boil for one minute. After your boiled water cools, put it in a clean bottle or pitcher with a lid and store it in your refrigerator. Use the water as you normally would. Ice made from contaminated water can also contain *Cryptosporidium*. To be safe, make your ice from boiled water. Water bottles and ice trays should be cleaned with soap and water before you use them. Do not touch the inside of your water bottles or ice trays. If you can, clean your water bottles and ice trays yourself.

B. **Filtering tap water:** There are many different kinds of home water filters, but not all of them remove *Cryptosporidium.* If you want to know if a particular filter will remove *Cryptosporidium,* call National Sanitation Foundation International (NSF) at (800) 673-8010. NSF is an independent testing group. If you want a list of filters that remove *Cryptosporidium,* call, write or fax NSF and ask for their "Standard 53 Cyst Filters" list. You can reach NSF at:

NSF International
3475 Plymouth Road
P.O. Box 130140
Ann Arbor, MI 48113-0140
Ph: (800) 673-8010
FAX: (313) 769-0109

If you choose to buy a filter, look for this information on the label:

Filters designed to remove Cryptosporidium

(any of the four messages below on a package label indicate that the filter should be able to remove Cryptosporidium)

- Tested and certified by NSF Standard 53 for cyst removal
- Tested and certified by NSF Standard 53 for cyst reduction
- Reverse osmosis
- Absolute micron size of 1 micron or smaller

Filters labeled only with these words may NOT be designed to remove *Cryptosporidium*

- Nominal 1 micron size
- Effective against giardia
- Effective against parasites
- Carbon filter
- Water purifier
- EPA approved
- Activated carbon
- Removes chlorine
- Ultraviolet light
- Pentiodide resins

Filters collect germs from your water, so you should have a friend who is not HIV positive change the filter cartridges for you or wear gloves and wash your hands if you must do it yourself. Filters may not remove *Cryptosporidium* as well as boiling, because some filters may not seal tightly or they may have other defects.

TEAR OUT FOR DISTRIBUTION TO PATIENTS

C. **Bottled water:** If you choose to drink bottled water, read the bottle label and look for this information:

Water has been processed by method effective against *Cryptosporidium*

- Reverse osmosis treated
- Distilled
- Filtered through an absolute 1 micron or smaller filter

Water may NOT have been processed by method effective against *Cryptosporidium*

- Filtered
- Micro-filtered
- Carbon-filtered
- Particle-filtered
- Multimedia-filtered
- Ozonated
- Ozone-treated
- Ultraviolet light treated
- Activated carbon-treated
- Carbon dioxide-treated
- Ion exchange-treated
- Deionized
- Purified
- Chlorinated
- Well water
- Artesian well water
- Spring water
- Mineral water

D. **Store-bought bubbly drinks:** Although no group tests prepared bubbly drinks like sodas and beer for *Cryptosporidium,* the water that is used for these drinks is usually filtered or heated enough to kill *Cryptosporidium*. *Cryptosporidium* is also killed when the drinks are mixed in the factory. So, sodas and other canned or bottled bubbly drinks can be assumed to be safe. Sodas not in a bottle or can or non-bubbly drinks may be made with tap water so they may not be safe. Hot tea and coffee also have no *Cryptosporidium.*

8. **Take extra care when traveling.**
   If you travel to developing nations you may be at a greater risk of getting cryptosporidiosis. Foods and drinks, in particular raw fruits and vegetables, tap water or ice made from tap water, unpasteurized milk or dairy products, and items purchased from street vendors may be contaminated with *Cryptosporidium.* You should avoid these items. Steaming hot foods, fruits you peel yourself, bottled and canned processed drinks and hot coffee or tea are probably safe to drink. Avoid swallowing water when swimming and avoid swimming in water that may be contaminated with human or animal waste. Talk with your health care provider about other precautions you may want to take when you travel abroad, especially in developing countries.

For more information on cryptosporidiosis, call the CDC AIDS Hotline at (800) 342-AIDS.

Missouri Department of Health
Bureau of Communicable Disease Control
Ph: (573) 751-6113

Additional information on cryptosporidiosis from the Centers for Disease Control and Prevention can be found on the Internet at http://www.cdc.gov/ncidod/diseases/crypto/crypto.htm.

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The Missouri Health Indicator Set

Allen Daugird, M.D., M.B.A.
Missouri Health Systems Partnership and Robert Wood Johnson Project

The Missouri Health Systems Partnership

The Missouri Health Systems Partnership was formed in early 1995 by executive order of Governor Carnahan to meet until December 1996. The partnership is composed of six public members from state agencies involved with health issues, six leaders representing private health care purchasers and six leaders representing private health care providers. The public-private partnership is funded through a grant from the Robert Wood Johnson Foundation to the state and is responsible for providing recommendations for improving Missouri's health care system to the Governor. One of the goals of the partnership is to sponsor a public-private effort to come to a consensus on a set of voluntary core health quality measures.

Missouri Health Indicator Set (MoHIS) Development Process

The Missouri Health Systems Partnership commissioned ad hoc Quality Indicators Working Groups. Five committees were formed through recommendations by partnership members and a process of requesting recommendations of multiple health-related state organizations. Membership was meant to be inclusive. It was composed of quality experts from the public and private sectors, including health plans, providers, purchasers and public agencies.

The MoHIS development process included:

- Developing a Conceptual Framework document, which includes criteria for ideal indicators;

- Using principles of Continuous Quality Improvement (CQI) and epidemiological population health as foundations for discussions and decisions;

- Acknowledging multiple customers of quality data: the public, purchasers, providers, plans, policy makers and public agencies;

- Being guided by study of the leading causes of morbidity, mortality and health care costs in Missouri, as well as published scientific literature. The goal was to choose quality indicators based on documented evidence;

- Attempting to build on and not replace national measures, such as Health Plan Employer Data and Information Set (HEDIS). Tables of grids were developed listing quality indicators used by various national organizations.

After an organizational meeting in September 1995, the five committees met monthly from November 1995 to June 1996. These committees include:

- Committee on Adult and General Process, Utilization and Outcomes Indicators
- Committee on Maternal and Child Health Process, Utilization and Outcomes Indicators
- Committee on Mental/Behavioral Health Process, Utilization and Outcomes Indicators
- Committee on Patient Satisfaction Indicators
- Committee on Functional Status and Risk Behaviors indicators

In the beginning of the process, the committees tried to be open and inclusive as they considered possible Indicators. Later Delphi techniques were used to prioritize and narrow the lists of potential Indicators. University of Missouri-Columbia Health Services Management faculty and graduate students helped search, review and summarize scientific literature for the committees. Many of the indicators are HEDIS measures, and the intent is to use HEDIS definitions of numerators and denominators for these. There was an attempt to include some important outcomes measures, such as emergency room/inpatient gun shot wound admission rates, which are clearly beyond the scope of sole accountability of health plans or provider systems. It was felt, however, that these were important health measures, and that although plans or providers cannot be ultimately fully responsible for them, they were an important part of solutions. These type of measures would be appropriate to feed back privately to plans and providers to support their own CQI programs, but not to be part of publicly released reports comparing plans or providers.

The final product of this intense effort is a draft version of MoHIS 1.0. The intent is utilization of this Indicator set by state agencies such as Missouri Medicaid and the Missouri Consolidated Health Care Plan, (MCHCP) which should simplify the quality data reporting burden for plans and providers. Some of the indicators would be appropriate measures to include in the development of consumer guides that the Missouri Department of Insurance, Missouri Medicaid and MCHCP plan to produce. It is hoped that MoHIS will be adopted voluntarily by many private organizations, allowing standard comparable measures of quality. Ultimately, the goal of producing MoHIS is to provide a tool which will improve the health of Missourians. Version 1.0 is only the beginning, and there will be a need for a public-private advisory group to refine MoHIS 1.0 and make recommendations concerning risk adjustment, analysis and interpretation of data and reporting formats. As the public mood endorses more accountability in health care, it is hoped that this ongoing public-private effort will provide a valid, trusted vehicle to measure quality of health and health care in Missouri.

Call for Public Comments

The final MoHIS 1.0 document will include detailed descriptions of each

(continued on last page)

Estimating Prevention of Hepatitis A Using Distribution of Immune Globulin and the Economic Impact of Intervention

C. Jon Hinkle
Northwestern District Health Office

Summary

In an effort to evaluate the economic value of disease prevention, an attempt was made to estimate the potential number of cases of hepatitis A disease that would arise from known contacts if those contacts were not treated prophylactically with Immune Globulin (IG), which prevents the disease when administered within 14 days of exposure. A literature search revealed attack rates of between 24 to 52 percent in persons who were identified as being exposed to the virus, but who did not receive IG in a timely manner. This information was applied to the known amount of IG distributed by the Missouri Department of Health during the five-year period 1990-94, and the projected cost of medical care for those who would have become ill was compared to the cost of providing prophylaxis with IG. Prophylaxis saved over $12 million in health care costs at a cost to the public of slightly more than $131,000.

Background

Review of three separate studies examining the infection rate of persons identified as contacts of acute hepatitis A cases but not receiving prophylaxis revealed secondary infection rates of between 24 and 52 percent. The combined incidence rate for the studies was 33 percent, based on 55 cases from an exposed population of 166 susceptible persons.

The initial study described an outbreak associated with a kindergarten in Switzerland during November and December of 1990. Eight of 38 children in the kindergarten were infected, as evidenced by presence of a positive anti-HAVIgM titer using standard laboratory methods. A total of 147 questionnaires to determine illness and exposure were administered, and a population of 82 susceptible exposed persons to whom IG was not given, or was given after the commonly accepted 14 day period during which it is effective, were identified. Of these, 20 persons (24%) developed clinical symptoms of hepatitis A and sero-converted to a positive anti-HAVIgM. In addition, three persons (4%) who received IG more than 14 days after their exposure showed no clinical symptoms but developed positive anti-HAVIgM titers.[1]

The second study concerned vertical transmission of hepatitis A from an infant, presumed to have been infected by his acutely ill mother at birth, in a neonatal intensive care unit (NICU). In this study, 42 susceptible health care workers in the NICU were identified. A total of ten of those staff (24%) developed positive anti-HAVIgM titers. Interestingly, 8 of 14 (57%) of NICU staff who reported that they rarely or never washed their hands immediately after working with the infant developed hepatitis A, while only 2 of 19 (11%) who reported washing sometimes or often became ill. In addition, three other infants who shared nursing staff with the infected infant also developed the disease.[2] For purposes of this analysis, the infants were not considered.

Finally, a Canadian study tested sera collected and frozen between 1974 and 1976 before immunoprophylaxis for hepatitis A was consistently applied. The study looked at 42 susceptible household contacts of 20 index cases. Of those contacts, 22 (52%) were or became anti-HAVIgM positive within six months of their exposure.[3] This is a much higher rate, and probably represents increased exposure opportunities offered by living in the same household with a positive case.

A study detailing the results of aggressive follow-up of hepatitis A cases to identify and prophylax contacts of cases identified between 1977 and 1980 described a 74 percent decrease in the incidence of hepatitis A in the study area during the program. That study estimated the cost of medical treatment of a single case of hepatitis A at $1,500, and set the cost of identifying and prophylaxing contacts at twice the cost of the IG.[4]

Findings

In Missouri during the period 1990-94, the Missouri Department of Health distributed 52,000 ml of IG. Using the guideline of 2 ml per adult dose, one can estimate that 26,000 doses were distributed during that period at a cost of $2.53 per dose for the IG alone.[5] Using Hadler's method of estimation, that would convert to an overall cost of $131,560 for hepatitis A prophylaxis for the five-year period. Applying the 33 percent combined secondary infection rate, 26,000 doses would represent 8,580 cases of hepatitis A prevented during that period. Finally, using $1,500 per case as a benchmark, 8,580 cases prevented represent $12,870,000 in health care costs avoided for an investment of somewhat over $131,000.

Discussion

This study suggests nearly a 100-fold return on investment. These figures do not consider the inflation in the cost of health care since 1980, nor the ancillary costs of lost productivity to those people who would have become ill and had to miss work. The 100 percent plus inflation in the cost of health care as reported by the Bureau of Labor Statistics (BLS) in the medical section of their Consumer Price Index (CPI) for the period 1983–93 would more than double the $12 million figure noted above. Likewise, there is no way to place a dollar value on the lives of those 43 Missourians who would have been expected to die of fulminant hepatitis A at the generally accepted case fatality rate of 0.5 percent.

Author's Note: *The original research for this article was completed early in 1995. The statistics used for the Missouri experience were, necessarily, limited to the year ending in December 1994. Since that time, a number of important factors that significantly affect the economic analysis have changed.*

In 1994, the Missouri Department of Health recorded 619 cases of hepatitis A statewide. In 1995, there was an increase of 116.2 percent to 1,338 reported cases. For the first six months of 1996 (the period ending June 30, 1996), 485 cases were reported, representing a drop from the 607 cases for the same period in 1995 but still significantly above the five-year median level of 385 cases.

During that same period, a continuing nationwide shortage of Immune Globulin (IG) made acquiring adequate supplies to deal with the increased case load very difficult. In addition, the cost of a 2 ml dose increased over 700 percent from the $2.53 average cited in the article to over $5 today. This unprecedented increase in cost has both overwhelmed the Bureau of Communicable Disease Control's budget and drastically distorted the calculations used in the original article. It is obviously no longer reasonable to use Hadler's method of doubling the cost of the IG to estimate the cost of providing prophylaxis for a hepatitis A contact. A more reasonable estimate might be obtained by using the approximate figure of $3.50 labor & materials cost current in 1994, multiplied by the increase in the medical section of the Consumer Price Index (CPI) produced by the US Bureau of Labor Statistics (BLS), and add to that the current cost of IG. The change from 1994 through June of 1996 in the medical care section of the CPI shows an inflation rate of nearly eight percent. This would raise the approximate cost of administering a single dose of IG to $3.78, plus the cost of the IG for a total of over $9 per dose. Coupled with the continued excess of cases of hepatitis A that are occurring in Missouri, this means that an increase in the funding for preventive measures is needed to prevent an otherwise predictably catastrophic increase in hepatitis-related health care costs.

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Cryptosporidiosis

(continued from page 2)

tected in a public water system, appropriate steps will be taken by DNR to ensure the safety of the water supply. If coliform bacteria are detected in a private water system (e.g., cistern, well), the affected family(ies) should be advised to boil all water used for drinking, food preparation, dishwashing, and tooth brushing until the problem in the water supply can be corrected.

One situation in which a water supply may be tested for *Cryptosporidium* is when a confirmed outbreak of cryptosporidiosis is believed to be linked to contaminated drinking water. In this instance, following consultation with DOH, arrangements may be made to test the water for the presence of the organism. Because the State Public Health Laboratory does not have the equipment to test for *Cryptosporidium*, arrangements for testing must be made with another facility.

Reporting Requirements

DOH rule (19 CSR 20-20.020) requires all known or suspected cases of cryptosporidiosis to be reported to the local health authority or to DOH within three (3) days of first knowledge or suspicion. A known or suspected outbreak of cryptosporidiosis must be reported within twenty-four (24) hours of first knowledge or suspicion by telephone, facsimile or other rapid communication.

Cryptosporidiosis on the Internet

Additional information on cryptosporidiosis from the Centers for Disease Control and Prevention is available on the Internet at http://www.cdc.gov/ncidod/diseases/crypto/crypto.htm

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Immunization Levels in Missouri's Public Clinics

Marilyn Kemna
Bureau of Immunization

The immunization levels of 2-year-old children served by Missouri's local health agencies (LHAs) have improved dramatically. Results of the 1995 Public Clinic Assessment Survey indicate that 78.1 percent of the children sampled are appropriately immunized by their second birthday, an increase of 17.5 percentage points from the levels reported the previous year. For this survey, a child was considered appropriately immunized if he/she had received a minimum of four DTP, three polio and one MMR by 24 months of age. This primary series has been used as the standard since the bureau began the survey in 1992, and allows a year-to-year comparison.

During the months of January through March 1996, immunization staff conducted on-site clinic assessments of the immunization records for children 2 years of age served by public agencies. Randomized sampling surveys were conducted following guidelines established by the Centers for Disease Control and Prevention (CDC). The age cohort sampled was children born between January 1, 1993 and December 31, 1993. Of the 26,061 children in this cohort served by public clinics, 62.2 percent (16,213) were included in the survey.

Percentages of children appropriately immunized for the primary series ranged from a high of 97.6 percent to a low of 27.9 percent among the LHAs. Immunization levels are shown by LHA in Figure 1.

Percentages were also calculated including additional vaccines (4 DTP, 3 OPV, 3 Hib, 1 MMR; and 4 DTP, 3 OPV, 3 Hib, 3 HB, 1 MMR), various combinations of vaccines and specific vaccines. These results are presented in Table 1.

This was the fourth year the Public Clinic Assessment Survey was conducted. Immunization levels have increased significantly, from 41.6 percent in 1992 to 78.1 percent in 1995, an increase of 36.5 percentage points.

Based upon survey results, fourteen LHAs have achieved the national goal of 90 percent immunization level compared to five LHAs for the previous survey period. See Figure 1.

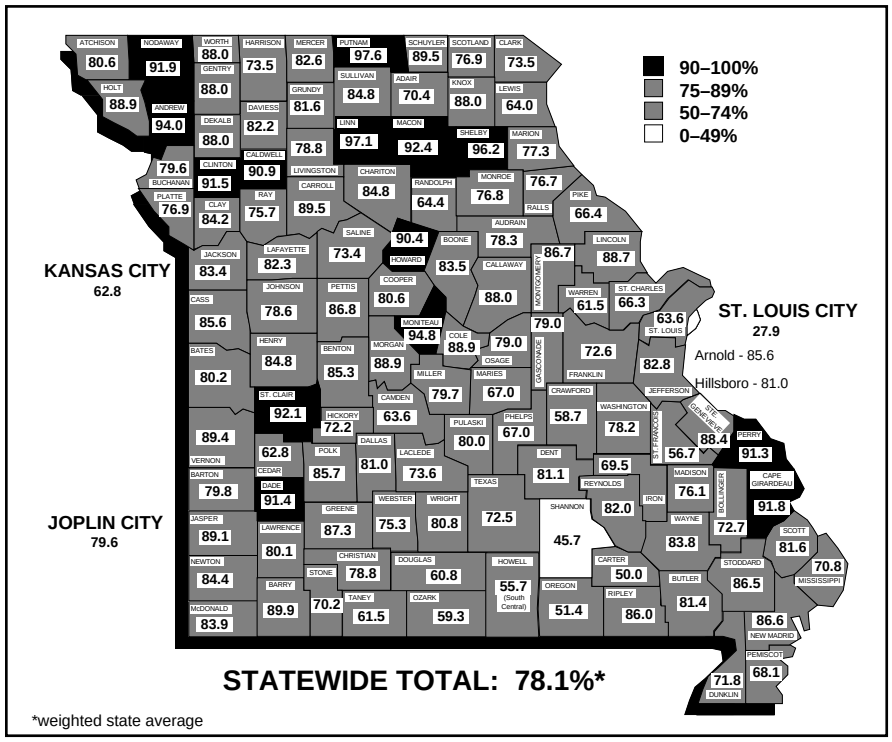

Figure 1. Public clinic immunization assessment levels at 24 months (4 DTP, 3 OPV, 1 MMR), Missouri, 1995.

Table 1. Public Clinic Immunization Assessment Survey Results, Missouri, 1995

Vaccine	Percent Immunized at 24 Months of Age
4 DTP, 3 OPV, 1 MMR	78.1%
4, DTP, 3 OPV, 3 Hib, 1 MMR	77.3%
4 DTP, 3 OPV, 3 Hib, 3 HB, 1 MMR	67.6%
3 DTP, 3 OPV, 1 MMR	85.8%
4 DTP	79.8%
3 OPV	90.9%
1 MMR	89.5%
3 Hib	92.7%
3 HB	80.4%

At the same time the Public Clinic Assessment Survey is conducted, an Annual Program Review survey is also completed. The *Standards of Pediatric Immunization Practices* are used as the model standard for measuring the quality of an agency's immunization services. All eighteen standards are covered in the review. Written recommen-

(continued on page 19)

Cold Injury Prevention

Diane C. Rackers
Office of Epidemiology

Bitterly cold weather is a significant hazard to life in our nation and in Missouri. During the past ten winters, 123 Missourians died from cold exposure and about half of these were age 65 and over . During last winter, 13 deaths due to cold-related causes were reported, 10 of those deaths were in individuals age 65 and over.

This emphasizes a need to be very supportive of the elderly, who are often homebound and bedfast and are particularly vulnerable to hypothermia due to having less fatty tissue insulation, impaired shivering mechanism, lower metabolic rates, chronic illnesses, limited mobility and less perception of the cold. They may also be trying to reduce expenditures on heating and may gradually get so cold that their body temperature falls below a critical level, and even at temperatures well above the freezing mark, they quietly die.

The very young are also highly vulnerable to hypothermia, but society protects them well. Babies should have sleeping rooms maintained at temperatures that feel comfortable to you and should have multiple layers of clothing and blankets that do no restrict the baby's breathing or movement.

The homeless and disadvantaged are also at great risk for hypothermia. Other risk factors associated with injury and death from the cold include alcohol use, certain illnesses and some medications that affect the nervous and vascular systems.

Illnesses that may adversely affect a person's response to cold temperatures include:

- Hypothyroidism and other disorders of the body's hormone system
- Stroke and other disorders that cause paralysis or reduce awareness
- Severe arthritis, Parkinson's disease and other illnesses that limit activity
- Any condition that reduces the normal flow of blood
- Memory disorders

Medications reported to contribute to core temperature depressions include: Acetaminophen, Atropine, Barbiturates, Benzodiazepines, Bethanechol, Bromocriptine, Butyropherones, Chloral hydrate, Clonidine, Cyclic antidepressants, Glutethimide, Lithium, Morphine, Nicotinic acid, Organophosphates, Phenformin, Phenothiazines, Reserpine and Tetrahydrocannabinol.

Hypothermia may develop out-of-doors and may be accompanied by frostbite especially when the wind chill factor is very low. As the speed of the wind increases, it carries heat away from the body much more quickly. When there are high winds, serious weather-related health problems are more likely, even when temperatures are only cool. See Wind Chill Factor Chart on page 18. Hypothermia can also occur at cool temperatures if a person becomes chilled from rain, sweat or submersion in cold water.

Another winter hazard is carbon monoxide poisoning, which can cause injury to the brain and the heart, resulting in permanent damage or death. Carbon monoxide poisoning can occur with the use of gas or kerosene heaters and indoor use of charcoal briquets for the purpose of either home heating or cooking because of an electrical power outage. In 1995, 47 cases of carbon monoxide poisoning were reported in Missouri.

Increased awareness is the most effective way to prevent and treat hypothermia. Health professionals should alert their high risk patients to the dangers of hypothermia and ways to prevent it. When prescribing medications, physicians should inform patients regarding any expected effects on core body temperature. Doctors, nurses and health professionals—including those working in emergency rooms—should remember to check patients for hypothermia.

Hypothermia and carbon monoxide poisoning are reportable in Missouri. Physicians are urged to report cases promptly to their local health departments.

Precautions to prevent cold-related injury:

- Wear several layers of warm, loose-fitting clothes.
- Sleep with plenty of blankets.
- Eat hot, nutritious meals.
- Maintain daily contact with some other person outside of your home.
- Avoid the use of alcoholic beverages.
- If able, exercise lightly to increase body heat.
- Place emergency phone numbers in a handy place.
- Check with your physician to see if the medications you take will affect your body temperature.
- Plan for cold weather emergencies such as a power outage or being stranded in your car.

WIND CHILL FACTOR CHART

Cooling Power of Wind on Exposed Flesh Expressed as an Equivalent Temperature (under calm conditions)

Estimated wind speed (in mph)	Actual Thermometer Reading (°F.)											
	50	**40**	**30**	**20**	**10**	**0**	**-10**	**-20**	**-30**	**-40**	**-50**	**-60**
	Equivalent Temperature (°F.)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-21	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(wind speeds greater than 40 mph have little additional effect.)	**LITTLE DANGER** (For properly clothed person) Maximum danger of false sense of security.				**INCREASING DANGER** Danger from freezing of exposed flesh.			**GREAT DANGER**				

Trenchfoot and immersion foot may occur at any point on this chart.

INSTRUCTIONS: Measure local temperature and wind speed if possible; if not, **estimate**. Enter table at closest 5°F interval along the top and with appropriate wind speed along left side. Intersection gives approximate equivalent chill temperature—that is, the temperature that would cause the same rate of cooling under calm conditions.

NOTES:

1. Wind may be calm but freezing danger great if person is exposed in moving vehicle, under helicopter rotors, in propeller blast, etc. It is the rate of relative air movement that counts and the cooling effect is the same whether you are moving through the air or it is blowing past you.

2. Effect of wind will be less if person has even slight protection for exposed parts—light gloves on hands, parka hood shielding face, etc.

ACTIVITY: Danger is less if subject is active. A person produces about 100 watts (341 BTUs) of heat standing still but up to 1,000 watts (3,413 BTUs) in vigorous activity like cross-country skiing.

PROPER USE OF CLOTHING and **ADEQUATE DIET** are both important.

COMMON SENSE: There is no substitute for it. The table serves only as a guide to the cooling effect of the wind on bare flesh when the person is first exposed. General body cooling and other factors affect the risk of freezing injury.

Adapted by the Missouri Department of Health from Fort Leonard Wood Form 8-2264 dated June 1991.

TEAR OUT FOR FUTURE REFERENCE

Missouri State Departments Develop Integrated Strategic Plans

Susan Jenkins
Office of Governmental Policy and Community Relations

Governor Carnahan established the Missouri Interagency Planning Council in March 1995 to facilitate implementation of the strategic planning process throughout all the executive branch departments of state government. In establishing the council, the Governor noted that his administration is committed to outstanding services for all Missourians. "Through greater customer (citizen) focus, higher standards of responsiveness and results-based budgeting, state government can make significant productivity improvements. To this end, we have worked through the Commission on Management and Productivity (COMAP) to establish an integrated strategic planning process that will add clarity of direction, structure and measurement to the operations of Missouri state government."

The Missouri Department of Health (DOH) has a rich heritage in strategic planning. Shortly after becoming a department in 1987, DOH published its first Strategic Plan for the Year 2000. That plan included goals and objectives within 13 priority areas. In 1990, DOH undertook an evaluation of the progress toward the goals that had been established in the 1987 plan, and developed an update to the plan. In 1992, the department developed the landmark *Healthy Missourians 2000* strategic plan modeled after the United States Public Health Service's *Healthy People 2000*. In developing *Healthy Missourians 2000*, DOH did a comprehensive assessment of its organizational strengths and weaknesses, analyzed the health status of the population, studied significant future trends, sponsored a strategic planning session with representatives of many important health and service organizations in Missouri to develop the strategic goals, established workgroups with participants from the broader community to develop objectives and held public hearings on the draft to obtain citizen input on our policy directions.

DOH has been working with the Interagency Planning Council to develop a 1996 Integrated Strategic Plan that builds on the department's extensive strategic planning history and uses the COMAP Integrated Strategic Planning Model and Guidelines. DOH's 1996 Integrated Strategic Plan was presented on October 1 with the submission of the department's Fiscal Year 1998 Budget Request to Governor Carnahan. One of the major strengths of the COMAP Integrated Strategic Planning Model is the link between strategic planning and budgeting. Every budget request is developed and reviewed in light of the department's vision, mission, strategic issues and goals.

The heart of strategic planning is not the plan document itself, but the commitment of DOH employees to identify the goals, outcomes, objectives and actions that improve the health of the Missouri population. Even as the department submits the 1996 Integrated Strategic Plan, the strategic planning process continues with work toward a 1997 plan. In July 1996, DOH began a more in-depth strategic planning process that will begin with programs, continue throughout the divisions, and culminate in the department strategic plan for 1997. DOH will solicit input from the general public, the Board of Health, Partnership Council, advisory committees and others as the department continues to redefine the agency vision, mission, values and goals for the 1997 Integrated Strategic Plan. DOH employees are enthusiastic about this opportunity to hear from customers on the services provided and to improve the way the department does business.

For additional information, please contact Susan Jenkins by phone at (573) 751-6003 or through Internet at jenkis@mail.health.state.mo.us

Immunization Levels

(continued from page 16)
dations for policy changes which could assist the LHA in increasing immunization levels are provided to the agencies. Particular emphasis is placed on ensuring linkage with WIC clinics, conducting aggressive reminder/recall for needed immunizations and conducting regular self-assessments.

The public clinic assessment determines the immunization levels of children served in the LHA clinics. In comparison, the National Immunization Survey, which is conducted by CDC, includes children served by both public and private health care providers and reflects an estimate for the entire state. The results of the most recent survey indicated that 75.5 percent of Missouri children were appropriately immunized.

The Department of Health has been challenged by the Governor to increase the immunization levels to 75 percent by September 1996 and to 90 percent by September 1997. The latest national survey results indicate that the first goal of 75 percent has been accomplished. To meet the goal of immunizing 90 percent of 2-year-old children, the bureau is encouraging private providers to assess the immunization rates of the children they serve. As a way of assisting, the bureau is offering the CDC-developed assessment program, Clinic Assessment Software Application (CASA) and training to private providers at no charge. This program will assist the providers in identifying gaps in immunization coverage.

Readers interested in obtaining more information, please contact the Bureau of Immunization at (573) 751-6133.

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The *Missouri Epidemiologist* is a regularly scheduled bimonthly newsletter published jointly by the Office of Epidemiology, Center for Health Information Management and Epidemiology (CHIME) and the Division of Environmental Health and Communicable Disease Prevention (EHCDP). CHIME's responsibilities include managing health statistical systems, epidemiological functions and information systems of the department. EHCDP's responsibilities include the prevention and control of communicable diseases and environmentally induced illnesses, including the requisite epidemiological investigations.

The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Office of Epidemiology, P.O. Box 570, Jefferson City, MO 65102-0570, Ph: (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

We're Moving

The Department of Health is moving to 930 Wildwood Drive, Jefferson City, MO 65109.

Maternal, Child and Family Health, Tuberculosis Control, Immunization, Communicable Disease Control, Veterinary Public Health, STD/HIV Prevention, Office of Epidemiology and Office of Injury Control moved on November 4 and 5. The remainder of the department will move on January 6 and 7.

Expect some disruption of service around those dates.

Our post office box address will remain P.O. Box 570, Jefferson City, MO 65102-0570.

Phone numbers will remain the same.

Missouri Health Indicator Set

(continued from page 13)
indicator, including rationale and definitions of the numerator and denominator. With publication of this draft, the partnership hopes to obtain comments and input from stakeholders of Missouri's health care system before a final version of MoHIS is published. This includes input from the public sector.

If you are interested in a draft copy of MoHIS, please contact the partnership at the location given below. Comments and questions should be directed to:

Missouri Health Systems Partnership
c/o Missouri Department of Health
1738 East Elm
PO Box 570
Jefferson City, MO 65102-0570
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Missouri EPIDEMIOLOGIST

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High Incidence of Meningococcal Disease in Southwest Missouri in 1995

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Background

Within a five-week period between March and April of 1995, three cases of meningococcal serogroup C meningitis occurred in the city of Joplin (which lies in both Jasper and Newton counties). These cases represented a rate of 7.34 cases of meningococcal disease per 100,000 population, seven times higher than the endemic rate of meningococcal disease in the United States. Since the three cases were caused by serogroup C meningococci, for which a vaccine is available, the possibility of community vaccination to prevent further cases was considered. However, case investigation by the Joplin City Health Department evidenced a lack of common interaction between the cases. In addition, the rate of meningococcal disease (7.34 cases per 100,000) was below the Centers for Disease Control and Prevention (CDC) guideline of 10-15 cases per 100,000 population for potential use of vaccine. Consequently, mass vaccination was not recommended at that time.

No further cases of meningococcal disease occurred within the city of Joplin until three months later, when a case of serogroup B meningococcal meningitis was reported in a 7-year-old with an onset date of July 28, 1995. The upward trend of the disease continued and by the end of 1995, a total of nine cases had occurred in Joplin, for a rate of 22.02 cases per 100,000 population. Of the nine cases, seven were from Jasper County and two were from Newton County. When an adjoining county, McDonald (south of Newton County), was included in the count, a total of 15 cases had occurred in the three-county area between March 1, 1995 and March 31, 1996. Close monitoring of the disease and consultation with CDC occurred throughout the year. Additional investigation of cases continued to show no correlation between cases (no common source or interaction). Also, the geographic distribution of the cases by residence was widely dispersed rather than clustered together.

Due to seven cases being serogroup B, CDC requested the isolates for enzyme typing. All seven were the same enzyme type (#566) not previously identified by the CDC. In February 1996, the Missouri Department of Health requested and the CDC sent an Epidemic Intelligence Service (EIS) Officer, who was accompanied by a medical student, to further investigate case findings and to conduct a case-control study to identify possible risk factors for disease. The CDC investigation, in cooperation with state, city and county health agency staff, began the week of March 18, 1996.

Health departments in the neighboring states of Kansas, Oklahoma and Arkansas were contacted regarding meningococcal disease occurring in counties adjoining Newton, Jasper and McDonald in Missouri. Ottawa County in northeast Oklahoma reported two cases and Benton County in northwest Arkansas reported six cases. The southeast corner of Kansas reported no cases. A total of 23 cases of meningococcal disease had occurred between March 1, 1995 and March 31, 1996 in the five-county area. State and city health agency staff from Missouri, Arkansas and Oklahoma joined CDC staff in the investigation of these additional cases.

Case-control study

Methods

To identify risk factors for meningococcal disease, a case-control study was

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Inside this Issue...

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conducted using the 23 cases occurring between March 1, 1995 and March 31, 1996. A case of meningococcal disease was defined either by isolation of *Neisseria meningitidis* from cerebrospinal fluid (CSF) or blood culture, or a CSF or blood latex agglutination test positive for *N. meningitidis*. Three controls for each case were selected through a house-to-house search and matched according to age and neighborhood of residence at the time of illness. A standardized face-to-face questionnaire was administered to all 23 cases (or parent of case) and 67 neighborhood controls (or parent of the control). Participants were asked about potential exposures.

In addition, available medical records of all cases in the five-county area who were reported to have meningococcal disease were reviewed to assess clinical manifestations of the illness.

Statistical Analysis

Data were collected on standardized forms. Data entry and univariate analysis were performed using Epi Info version 6.01 (CDC, Atlanta, GA). Categorical variables were compared using the chi-square or Fisher's exact test. Continuous variables were evaluated using the Kruskal-Wallis test for the comparison of means. Crowding within the house was calculated by creating a variable of the number of people per room. This variable was divided into quartiles and the quartiles were correlated with disease. Odds ratios, 95 percent confidence intervals and p-values were calculated for the case-control study.

Results

Between March 1, 1995 and March 31, 1996, there were 23 cases of meningococcal disease in the study area; 10 (43%) were serogroup B isolates. See Figure 1. Among the ten serogroup B cases, only two (20%) were positive by the latex agglutination test. All of these serogroup B isolates were identical by enzyme-typing. This enzyme-type, designated ET-566 by CDC laboratory numbering system, had not been previously identified. Ten of the 23 isolates were serogroup C, and three isolates were classified by the state laboratories as undetermined serogroup. Serogroup C isolates were of different enzyme types. Three of the ten (30%) serogroup B cases and four of the ten (40%) serogroup C cases were fatal. One of the three undetermined cases was also fatal. There was an overall case fatality rate of 35 percent.

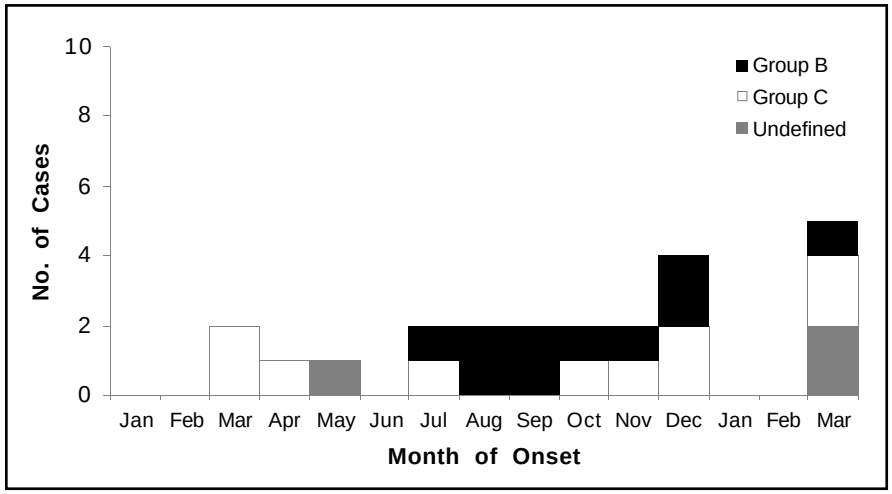

Figure 1. Cases of meningococcal meningitis in five contiguous counties in southwest Missouri, northeast Oklahoma and northwest Arkansas, 1995–96.

Eighteen (78%) of the cases were male. The ages of cases ranged from 2 months to 42 years. About 57 percent were older than 5 years of age. No common organizational exposures (e.g., schools, universities, places of employment) were discovered among the cases.

Results of the univariate analysis showed that among children less than 18 years of age, having a mother that smoked cigarettes was a significant risk factor (Odds Ratio [OR]=5.2, 95% confidence interval [CI]=1.4-19.8). Having at least one family member who smoked cigarettes approached significance as a risk factor (OR=3.3, 95%CI=0.9-12.7). Also, among cases less than 18 years old, not being insured (OR=6.8, 95%CI=1.4-34.2) and mother's education less than high school (OR=4.3, 95%CI=1.3-14.7) were both risk factors for disease. Crowding approached significance as a risk factor for disease among children, (OR=3.3, 95%CI=0.9-12.0), when the upper quartile, ≥0.8 people per room, is compared to the lower three quartiles, <0.8 people per room.

When adults and children were analyzed together in the case-control study, an upper respiratory infection in the two weeks preceding the onset of meningococcal disease was significantly associated with disease (OR=3.0, 95%CI=1.0-9.4). Males were 1.4 times (95%CI=1.1-2.2) more likely than females to experience disease, and household size (>5 members) was larger among cases than controls (OR=4.4, 95%CI=1.1-18.2).

Discussion

This represents a community outbreak within a five-county area in southwest Missouri, northwest Arkansas and northeast Oklahoma. The outbreak was caused by the circulation of both serogroup B and C disease. While the serogroup C isolates were of multiple enzyme types, the serogroup B disease was linked to a single enzyme type, ET-566. This enzyme type has not been previously described in association with outbreaks of meningococcal disease.

There are several hypotheses for the increased rate of both serogroup B and serogroup C meningococcal disease. First, the introduction of the "new"

serogroup B ET-566 strain might have resulted in increased disease, since this enzyme type might be associated with a set of antigenic determinants that the population had not previously been exposed to. Secondly, the finding of a correlation with upper respiratory disease is consistent with other outbreaks. The correlation between influenza and meningococcal outbreaks have been described in previous studies.[1,2] Missouri surveillance for flu-like illness revealed a particularly severe and early influenza season in 1995. Serologic studies are underway to evaluate the possible contribution of influenza virus to the community outbreak.

The risk factors identified in the neighborhood case-control study are consistent with other studies. Low socioeconomic status, smoking, and for children, living with adult smokers, have all been previously described as risk factors for meningococcal disease. On July 16, 1996, the CDC issued their final report with the following four recommendations:

- The health care community in the affected area should be informed of the increased rate of meningococcal disease in the community and be advised to have a high index of suspicion for meningococcal disease among febrile persons.
- Based on the finding that eight of ten serogroup B cases were negative by the agglutination test, it is important to remind physicians that this test is NOT useful for the diagnosis of meningococcal disease. Treatment should be based on clinical signs and suspicion of meningococcal disease. Clear CSF does NOT indicate the absence of meningococcal disease.
- The rates of serogroup C meningococcal disease should be carefully monitored to determine the potential utility of a community vaccination campaign.
- Public health education campaigns concerning meningococcal disease should include information on the risk of smoking to the health of children.

(continued on page 22)

Meningococcal Disease*

Meningococcal disease is a severe bacterial infection caused by the germ, *Neisseria meningitidis*. This germ has several serogroups (A, B, C, W-135, X, Y, and Z). Generally, the disease occurs in the winter and spring. However, sporadic cases can occur throughout the year. At any given time, 5–10 percent of the population may carry this germ in their nose and throat without any signs of illness. Others develop serious symptoms.

Anyone can get meningococcal disease, but it is more common in infants, children and young adults. Susceptibility decreases with age. Children exposed to tobacco smoke are at higher risk for respiratory illness, including meningitis. Individuals lacking certain complement components are at risk to contract or experience recurrence of this disease. When this bacteria affects the meninges (a thin layer of tissue covering the brain and spinal cord), it is call meningococcal meningitis.

The disease is characterized by sudden onset of fever with severe headaches, nausea and/or vomiting, stiff neck, with or without a purplish rash, confusion, and coma. Symptoms may appear 2 to 10 days following exposure, but usually within 3 to 4 days.

A person may transmit the meningococcal bacterium from the time he/she is first infected until the germ is no longer present in discharges from the nose and throat. Disease spread requires direct contact (including spray from coughing) with these discharges. Persons are usually no longer infectious after 24 hours of effective antibiotic treatment—usually penicillin, however, other antibiotics can also be effective in treating this disease.

Persons who have been in close contact (household members, intimate contacts, child care centers or nursery school playmates and health care personnel performing mouth to mouth rescue breathing, intubation or deep suctioning) should receive preventive antibiotic treatment. Casual contact as might occur in a regular classroom, office, or factory setting usually does not warrant preventive treatment.

Presently, there is a vaccine that will protect persons against four of the seven serogroups (NOT B, X or Z) of meningococcus. Unfortunately, it can not be administered to children under 2 years of age. In addition, the duration of protection in young children is less than two years. Vaccination is recommended in outbreak situations (must be correct strain), for individuals with specific medical conditions (e.g., anatomic or functional asplenia and terminal complement deficiency) and for those travelling to areas of the world where the disease is more common.

Diagnosis and Treatment Guidelines for Urinary Tract Infections in Long-Term Care Facilities: When should one perform cultures? Do all positive cultures require treatment?

William Salzer, M.D.
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Scope of the Problem

In residents of long-term care facilities (LTCFs), urinary tract infections (UTIs) are the most common bacterial infection. The urinary tract is also the most common source of bacteremia in elderly patients in LTCFs, which results in significant mortality.

Positive urine cultures are common in the elderly, occurring in up to 50 percent of those who are debilitated and in virtually 100 percent of patients with long-term bladder catheters. Most elderly patients with positive urine cultures have no symptoms of UTI. If these patients have a significant level of bacteria in the urine, the infection is called asymptomatic bacteriuria. Bacteriuria is defined as a culture growing >100,000 colonies of bacteria per ml. of urine. Cultures growing a single organism at this level are highly specific for true infection.

In non-catheterized ambulatory persons over the age of 80 living outside LTCFs, asymptomatic bacteriuria is present in 10-15 percent of men and women. However, the incidence of asymptomatic bacteriuria in debilitated, non-catheterized residents in LTCFs approaches 50 percent. Several placebo-controlled studies have shown that treating asymptomatic bacteriuria with antibiotics is of little benefit. In fact, antibiotics may be harmful. Treated patients have a slightly decreased risk of developing symptomatic UTI for a few weeks after treatment, but by six weeks, asymptomatic bacteriuria is present at the same rate in treated and untreated patients. In debilitated residents in LTCFs, treatment with antibiotics does not affect long-term mortality, and does not alter incontinence in chronically incontinent patients.

Clinical studies support the fact that in a patient without signs or symptoms of UTI, a urine culture should not be performed. Furthermore, a patient without urinary tract symptoms or signs should not be treated for a positive culture for the following reasons:

- It's difficult to make an asymptomatic patient feel better;
- The risk of adverse drug reactions or drug-drug interactions;
- Treating the patient's positive culture has minimal clinical benefit;
- Unnecessary antibiotic therapy promotes the development and spread of antibiotic-resistant bacteria.

Urine cultures should be obtained in the elderly patient with urinary tract symptoms (frequency, dysuria, suprapubic pain, pyuria, or new or worsening incontinence) or with suspected sepsis. Empirical therapy with antibiotics is appropriate in the patient with symptoms of cystitis and pyuria, but with no fever or signs of toxicity. Unfortunately, because of the spread of antibiotic resistance in the community, the old reliable drugs like amoxicillin, nitrofurantoin and sulfa drugs alone will fail up to one-third of the time. For initial empirical treatment of cystitis, the current drug of choice is trimethoprim/sulfamethoxazole. In sulfa-allergic patients, either trimethoprim alone (100 mg. bid) or a quinolone antibiotic should be used. For simple cystitis, a three-day course of antibiotics works as well as seven days and is more effective than one-dose therapy. In older males with frequent recurrences of cystitis, chronic bacterial prostatitis should be suspected. Patients with chronic bacterial prostatitis are often cured with a four-week course of a quinolone because of the superior penetration of these drugs into the prostate tissue.

Sepsis in the elderly often presents atypically. Fever may be low grade, absent or patients may actually become hypothermic. Frequently, the only sign is a decrease in mental status. The urinary tract is the most common source of gram-negative bacteremia. Cultures of blood and urine should be obtained and broad spectrum parenteral antibiotics with good gram-negative coverage, like third generation cephalosporins, extended spectrum penicillins, or quinolones, should be administered to the elderly patient with suspected sepsis pending the results of cultures.

Catheter-Associated Urinary Tract Infections

Ten percent or more of residents in LTCFs have long-term indwelling bladder catheters. Urine cultures are positive virtually 100 percent of the time in patients with chronic catheters. Often, these cultures contain multiple species of organisms. In these patients, the urinary tract is the most common source of gram-negative sepsis. When these patients appear septic, cultures of blood and urine should be performed, and empirical parenteral antibiotic therapy started. This therapy should include broad coverage for gram-negative rods, such as pseudomonas like ceftazidime, piperacillin, aminoglycosides or ciprofloxacin.

On the other hand, urine cultures should not be performed on the patient with a chronic catheter who has no local or systemic symptoms of UTI. Again, the cultures will always be positive, and

more importantly, positive cultures without symptoms should not be treated with antibiotics, so why culture? There are several good reasons not to treat these patients:

- One can never sterilize the urine of a patient with a chronic catheter; the susceptible bacteria that you treat are rapidly replaced with resistant organisms;
- When patients with chronic catheters who have received antibiotics develop symptomatic infections or urosepsis, they invariably have resistant bacteria which are usually more difficult and expensive to treat;
- Patients with chronic catheters who have been treated with antibiotics often become a reservoir for resistant bacteria like methicillin resistant *Staphylococcus aureus*, vancomycin resistant enterococci, multiply resistant gram-negative rods and yeast, which can spread to other patients in their environment.

Attempts at preventive or prophylactic therapy in patients with chronic catheters will have a similar effect on the selection of resistant organisms. Reduction in morbidity from catheter-related infections is best achieved through good infection control practices. First, does the patient really need a chronic catheter? Patients who can empty their bladders can be managed with diapers or with external urinary catheters in males. The disadvantages of these approaches include problems related to skin breakdown problems on the penis, perineum or sacral regions and must be weighed against the risks associated with catheterization. Strict adherence to closed drainage systems and periodic catheter changes help to reduce the incidence of infection. Also, good handwashing by health care workers and avoidance of using common collecting vessels when emptying collection bags will help reduce the spread of pathogens from patient to patient.

Summary: The Main Take-Home Points for Treating UTIs in LTCFs

- Bacteriuria is common in elderly persons and is universal in those with long-term bladder catheters.
- In most instances, bacteriuria is asymptomatic in this population.
- Antibiotic treatment of asymptomatic bacteriuria is of no benefit, and in fact, may be harmful.
- Do not perform urine cultures on asymptomatic patients.
- Patients with local or systemic signs or symptoms of UTI should have urine cultures performed and receive appropriate therapy based on culture results.

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To Our Readers...

Re: Division Name Change

We are pleased to announce our new name, the Division of Environmental Health and Communicable Disease Prevention. The change was effective September 19, 1996. We were formerly known as the Division of Environmental Health and Epidemiology. Bureaus in this division are: Tuberculosis Control, Communicable Disease Control, Veterinary Public Health, Immunization, STD/HIV Prevention, Community Environmental Health and Environmental Epidemiology.

Our new name reflects our mission, which is to protect and promote the public's health by:

- assessing indicators of communicable disease and environmental hazards;
- assuring access to disease prevention, intervention and environmental assessment services;
- developing policies and regulations;
- educating the public and promoting healthy behaviors; and
- collaborating with public and private entities.

Reducing Unintended Pregnancies in Missouri

Vicky Howell, Ph.D.
Bureau of Health Data Analysis

Over half of the pregnancies in the United States are unintended at the time of conception.[1] Unintended pregnancies include those which occur earlier than desired and pregnancies which are wanted neither at the time of occurrence nor at some future time. The basis of many contemporary reproductive issues, such as teen pregnancy, nonmarital pregnancy and abortion, lies in the frequency of unintended conception. A primary goal of the state in providing family planning services is the reduction of unintended pregnancies in Missouri. See related article on family planning on pages 8–10 and 23 of this issue.

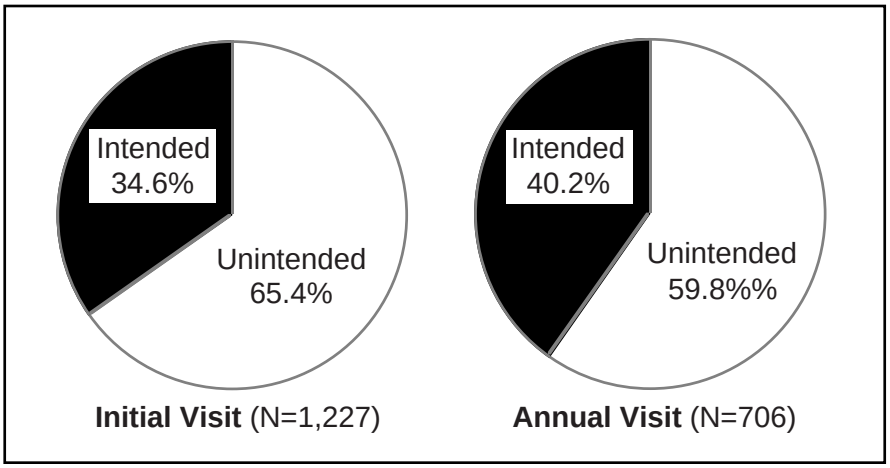

Figure 1. Family planning clients pregnant within past year by intentionality of pregnancy, Missouri, fiscal year 1995.

Intentionality of Pregnancy

Family planning data from general revenue and Title V funded clinics outside the major metropolitan areas* provide information on initial and annual visits made to family planning clinics from July 1994 through June 1995. Although these data will not allow us to directly assess the reduction of unintended pregnancies in Missouri, we can examine intentionality of pregnancy and change in contraceptive practices. Clients making initial visits are assumed to be entering the family planning system while those making annual visits are already participating in the system.

Of all clients making an initial or annual visit to a family planning clinic, approximately 12 percent (2,213) had been pregnant in the 12 months preceding the visit. Of these pregnancies, 32 percent were intended and 55 percent were unintended with pregnancy intention unknown for the remaining pregnancies. Clients making an initial visit to a family planning clinic had a higher rate of unintended pregnancy than did clients making an annual visit. Nearly two-thirds of the clients with a pregnancy during the previous 12 months were making an initial visit to the clinic. Figure 1 shows the breakdown by type of visit and intentionality for those clients with a pregnancy within the past year. As Figure 1 indicates, not only did those women making an initial visit have more pregnancies, but also more of these pregnancies were unintended than were those of the women making an annual visit. Nevertheless, it is important to note that the majority of pregnancies were unintended even for those making an annual visit. Table 1 presents pregnancy rates by type of visit. Women making an initial visit to a family planning clinic had a much higher rate of pregnancy (200.0 per 1,000 females) than did women making an annual visit. This latter rate (73.1) was close to the overall state rate of 74.4 pregnancies per 1,000 females of childbearing age (defined as ages 15 through 44).

Table 1. Pregnancy Rates in Family Planning Clients Pregnant Within Past Year by Type of Visit, Missouri, Fiscal Year 1995

Type of Visit	Number	Rate per 1,000 Females
Initial	1,361	200.0
Annual	852	73.1
Overall State		74.4

Contraceptive Practice Change and Pregnancies Averted

A measure of family planning impact is change in contraceptive practice. The contraceptive methods used by the client before and after the visit are compared in Table 2. Of all clients making an initial or annual visit, nearly 2,000 were not using any method of contraception prior to the visit. Nearly 75 percent of these clients began using a prescription-based method and an additional six percent began using an over-the-counter method. Also, of those clients making an initial or annual visit with prior use of an over-the-counter method, over 75 percent changed to a prescription-based method. Clients who had been pregnant within the past year and had not been using a contraceptive were even more likely to adopt a prescription-based method (81.2%). Ninety percent of all clients chose one of the more-effective (prescription-based) methods as their contraceptive following the family planning visit.

*Title V clinics in St Louis City, St Louis County and Kansas City only furnished aggregate data for fiscal year 1995 but will be providing individual client data beginning in fiscal year 1996.

Table 2. Family Planning Clients by Type of Visit and Contraceptive Method, Missouri, Fiscal Year 1995

Method Prior to Family Planning Visit	Method Following Family Planning Visit								
	Total	No Method*		Over-the-Counter Method**		Prescription-Based Method***		Sterilization	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
No Method*	**1,683**	331	19.7	108	6.4	1,242	73.7	2	0.1
Over-the-Counter**	**4,168**	41	1.0	930	22.3	3,191	76.5	6	0.1
Prescription-Based***	**11,327**	64	0.6	118	1.0	11,133	98.2	12	0.1
Total	**17,178**	**436**	**2.5**	**1,156**	**6.7**	**15,566**	**90.6**	**20**	**0.1**

* Excluding those pregnant or seeking pregnancy.
** Over-the-counter methods include abstinence, natural family planning, withdrawal, condom, condom with spermicide, contraceptive foam, jelly or cream and contraceptive sponge.
*** Prescription-based methods include oral contraceptive, cervical cap, IUD, Depo Provera, Norplant and diaphragm.

Forrest and Singh estimate that "For every 1,000 women using reversible contraceptives and relying on a publicly funded provider, 260 unintended pregnancies are prevented, including 112 live births and 114 induced abortions with the remainder being spontaneous abortions and stillbirths."[2] Of the 18,464 females who utilized family planning clinics either for an initial or annual visit, 90.4 percent (16,689) were using a reversible contraceptive method after the visit. Applying Forrest and Singh's estimate to the 16,689 would suggest 4,339 averted pregnancies, including 1,869 live births, 1,903 induced abortions and 567 spontaneous abortions and stillbirths.

Discussion

Unintended pregnancies, pregnancies occurring earlier than desired or not wanted at even some future date, account for over half the pregnancies in Missouri and the United States. A key aim of family planning programs is to enable women to better control their fertility through delaying or preventing pregnancy. In this report, data from family planning programs funded by general revenue funds and Title V were used to examine the impact of family planning on pregnancy intention and contraceptive practice.

Clients entering into the family planning program were nearly three times more likely to have had a pregnancy during the past twelve months than were women already part of the system. Ninety percent of all family planning clients left their family planning visit using a prescription-based contraceptive. In addition, using a method advocated by Forrest & Singh,[2] it is estimated that 4,339 pregnancies were averted among the females who utilized these publicly funded family planning clinics.

REFERENCES:

1. Institute of Medicine. The best intentions: Unintended pregnancy and the well-being of children and families. Washington, DC: National Academy Press, 1995.
2. Forrest JD, Singh S. Public-sector savings resulting from expenditures for contraceptive services. Family Planning Perspectives 1990;22:1,6–15.

Immunizations Required for School Attendance 1997–98 School Year

Legislation was passed on August 16, 1996 which requires three doses of hepatitis B vaccine for all students entering kindergarten beginning with the 1997-98 school year.

In addition to hepatitis B, students in kindergarten through seventh grade are required to have two doses of measles containing vaccine (MMR, MR or measles vaccine) and must have received the last dose of polio, diphtheria, and tetanus on or after their fourth birthday.

Students kindergarten through first grade must also have received the last dose of pertussis on or after their fourth birthday.

Family Planning Services in Missouri

Vicky Howell, Ph.D.
Bureau of Health Data Analysis

Need for Family Planning Services

Unintended pregnancy, especially unintended childbearing, has important consequences not only for the individuals involved but also for the society as a whole. Decreased life opportunities and/or economic hardship affects the individual woman giving birth as the result of an unintended pregnancy, and also leads to increasing demands on public services. Higher rates of low birth weight, infant mortality, inadequate prenatal care, and maternal engagement in harmful behaviors such as substance abuse are all associated with unintended pregnancies.[1] Figures 1 and 2 illustrate the trend over time of some major indicators of unintended pregnancies. Consequently, the provision of services to individuals enabling control over fertility is an important public concern. See related article on reducing unintended pregnancies on pages 6 and 7 of this issue.

The proportion of pregnancies in the United States that are unintended is high—57.3 percent in 1987.[2] Half of these unintended pregnancies end in induced terminations and half result in a live birth.[1] The proportion of births resulting from unintended pregnancies increased from 37 percent in 1982 to 44 percent in 1990.[1] In Missouri, the proportion of births resulting from unintended pregnancies may be even higher. The National Institute of Child Health and Human Development/Missouri Maternal and Infant Health Survey, a case-control study of women who gave birth between December 1, 1989 and March 31, 1991, found that over 50 percent of all births were unintended.[3]

Provision of family planning services to women at risk of unintended pregnancy thus becomes of vital importance. Missouri is close to the national estimated rate[4] for both the percentages of all women (13–44) at risk of unintended

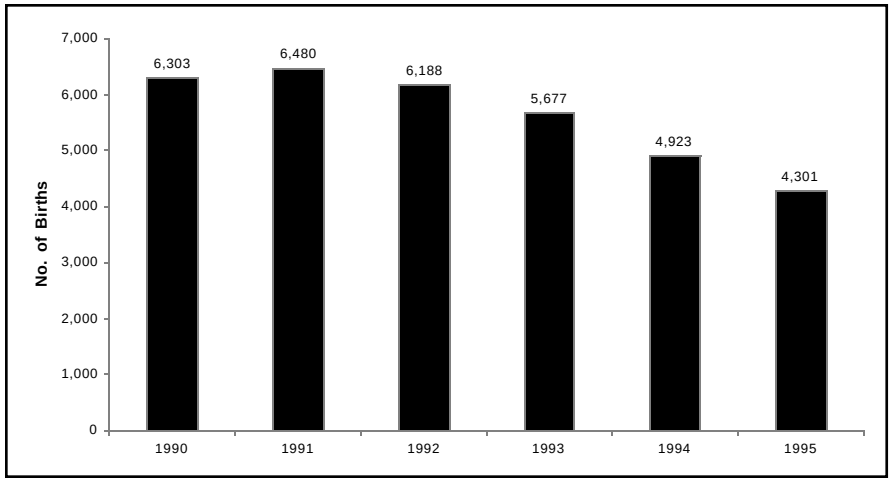

Figure 1. Births spaced less then 18 months apart by year, Missouri, 1990–95.

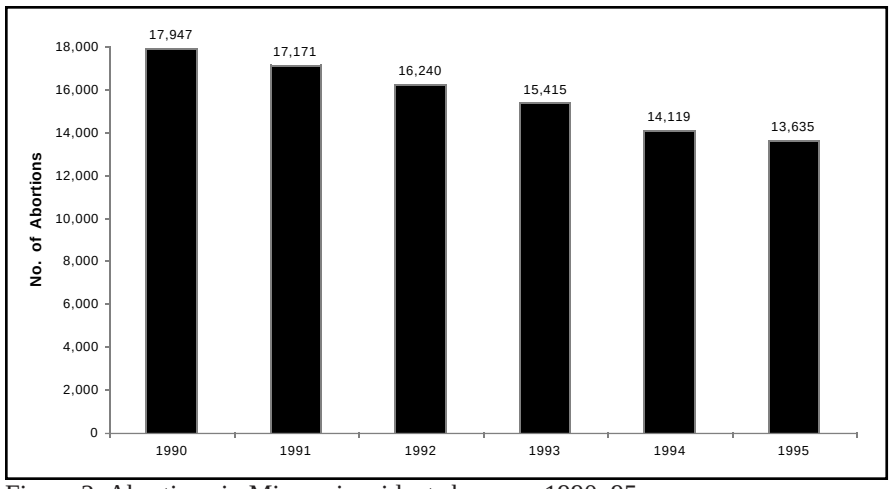

Figure 2. Abortions in Missouri residents by year, 1990–95.

Table 1. Family Planning Female Clientele by Age and Type of Visit, Missouri, Fiscal Year 1995

Age	Initial Visit Number	Initial Visit Percent	Annual Visit Number	Annual Visit Percent	Total Visits Number	Total Visits Percent
<15	212	3.1	79	0.7	291	1.6
15-17	1,483	21.8	1,063	9.1	2,546	13.8
18-19	1,022	15.0	1,315	11.3	2,337	12.7
20-24	1,791	26.3	3,415	29.3	5,206	28.2
25-29	966	14.2	2,367	20.3	3,333	18.0
30-34	650	9.6	1,914	16.4	2,564	13.9
35-39	323	4.8	887	7.6	1,210	6.6
40-50	196	2.9	352	3.0	548	3.0
Unknown	161	2.4	268	2.3	429	2.3
Total	**6,804**	**100.0**	**11,660**	**100.0**	**18,464**	**100.0**

pregnancy (48.4 Missouri, 49.4 United States) and of all women in need of organized or subsidized contraceptive services (25.6 Missouri, 24.4 United States). In this report we look at family planning data reported by clinics funded through General Revenue (GR) funds and many clinics funded by Title V. Individual client data was not provided by Title V clinics in St. Louis City, St. Louis County and Kansas City. Also, this file does not contain client data for other publicly funded family planning sources (e.g., Medicaid, Title X, Federal 330 and 329 clinics). Because of these shortfalls in data completeness, minorities, who mostly reside in Missouri's major cities, are under represented in this file. (St. Louis City, St. Louis County and Kansas City will be providing individual data beginning in fiscal year 1996.)

Table 2. Family Planning Female Clientele by Race and Type of Visit, Missouri, Fiscal Year 1995

Race	Initial Visit Number	Initial Visit Percent	Annual Visit Number	Annual Visit Percent	Total Visits Number	Total Visits Percent
White	6,055	89.0	10,348	88.7	16,403	88.8
African American	604	8.9	1,205	10.3	1,809	9.8
American Indian	27	0.4	14	0.1	41	0.2
Asian/Pacific Islander	31	0.5	33	0.3	64	0.3
Other	87	1.3	60	0.5	147	0.8
Total	**6,804**	**100.0**	**11,660**	**100.0**	**18,464**	**100.0**

Table 3. Selected Characteristics of Family Planning Female Clientele by Type of Visit, Missouri, Fiscal Year 1995

	Initial Visit Number	Initial Visit Percent	Annual Visit Number	Annual Visit Percent	Total Visits Number	Total Visits Percent
Education						
<9 yrs.	372	5.5	233	2.0	605	3.3
9–11 yrs.	2,010	29.5	2,142	18.4	4,152	22.5
12 yrs.	2,734	40.2	6,052	51.9	8,786	47.6
13–17 yrs.	1,093	16.1	2,356	20.2	3,449	18.7
Unknown	595	8.7	877	7.5	1,472	8.0
Current Student						
Yes	2,207	32.4	2,491	21.4	4,698	25.4
No	4,597	67.6	9,169	78.6	13,766	74.6
Marital Status						
Married	1,999	29.4	4,548	39.0	6,547	35.5
Never Married	4,031	59.2	5,723	49.1	9,754	52.8
Divorced	494	7.3	1,061	9.1	1,555	8.4
Separated	209	3.1	255	2.2	464	2.5
Widowed	71	1.0	73	0.6	144	0.8
Poverty Status						
<=100%	2,815	41.4	3,938	33.8	6,753	36.6
101–150%	1,614	23.7	3,539	30.3	5,153	27.9
151–250%	695	10.2	1,667	14.3	2,362	12.8
>250%	866	12.7	1,262	10.8	2,128	11.5
Unknown	814	12.0	1,254	10.8	2,068	11.2
Total	**6,804**	**100.0**	**11,660**	**100.0**	**18,464**	**100.0**

Description of GR/Title V Family Planning Clientele

Between July 1994 and June 1995, 18,464 females made an initial or annual visit to a family planning clinic. Of these, nearly 7,000 were initial visits. Although all women with unimpaired fertility are at risk of unintended pregnancy, incidence is higher among certain groups of women. Females at either end of the reproductive age spectrum (<20 or >39), unmarried women and poor women have higher rates of unintended pregnancy than do women 20-39 years of age, married women and women with incomes greater than 200 percent of the poverty level.[2] Tables 1–3 present the demographics of the clientele utilizing family planning services.

An examination of the data reveals that those females making an initial visit to a family planning clinic are more likely to fall into those groups most at risk of an unintended pregnancy. As Table 1 indicates, nearly 40 percent of the clientele making an initial visit to a family planning clinic are under the age of 20 compared to 21 percent of those returning for an annual visit. Since the data do not include the largest urban areas in the state, the clientele is predominantly white as shown in Table 2. Thirty-five percent of the clients at an initial visit have less than a high school education compared to 20 percent of the females at an annual visit. Only 30 percent of the women making an initial visit are married compared to nearly 40 percent of those at an annual visit. Concomitant with these

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characteristics of youth, unmarried and low education, 41 percent of the clientele at an initial visit have incomes at or below 100 percent of the federal poverty level compared to slightly less than 34 percent at annual visits

There are differences in service characteristics by type of visit. A higher percentage of women making an annual visit to a family planning clinic chose one of the more effective (prescription-based) contraceptives than did women making an initial visit. Although the prescription-based contraceptives are more effective in preventing pregnancy than the less effective (over-the-counter) methods not requiring visits to a medical provider, they are not effective in preventing sexually transmitted diseases, including HIV infection. Over 90 percent of the female clients leaving the clinic after a family planning visit, do so with one of the more effective prescription-based means of contraception. Although it is important to determine if secondary methods are being employed to lessen the transmission of STD/HIV infection, due to incomplete data not much can be said other than that condoms appear to be the most selected secondary method. Missing and incomplete data also hampers obtaining a clear indication of why women leave a visit to a family planning clinic without a contraceptive. Only 35–40 percent of the clients leaving either an initial or annual visit without a method of contraception have a specific reason, such as seeking pregnancy, noted on their record.

As women reach their 30s, methods of contraception change with a decrease in prescription-based methods and an increase in the choice of sterilization or no contraception as women either achieve their desired family size or confront the necessity of doing so amidst declining fertility. After the age of 35, the use of less effective over-the-counter contraceptive methods reflects the lower risks as fertility decreases. Among women age 40 or over, nearly a third have chosen sterilization either of self or partner as a means of contraception.

For all women making a family planning visit, current student status corresponds with a higher rate of choosing one of the more effective prescription-based methods; although, completed years of education do not appear to be related to contraceptive choice. However, for women making an initial visit, those completing at least 12 years of education were more likely to choose an over-the-counter-method than were women with less than 12 years of education. Whites and never married women are also more likely to choose prescription-based contraceptives. Poverty status seems clearly related to the choice of the less effective, over-the-counter contraceptives; clients closest to the poverty level were more likely to choose that method. Women with incomes greater than 250 percent of poverty were less likely to choose an over-the-counter contraceptive at initial and annual visits than were women at any other level of income. Poverty status may also help explain the different pattern of contraceptive choice by African Americans and whites. African Americans are more likely than are whites to use no method of contraception or to use a less effective over-the-counter method or sterilization.

High-Risk Group

Public family planning services are set up to address the fertility needs of all women in the fertility range. However, there are particular segments of that population that are at higher risk of having an unintended pregnancy than others. As noted previously, these groups include women under the age of 20, over the age of 39, those never married, those living with income below the poverty level and non-teenaged women with less than a high school education.

Women having one or more of the above noted high risk factors accounted for 81.8 percent of all initial visits, 71.6 percent of all annual visits and 75.4 percent of total visits. This indicates that the services are being utilized by those at highest risk for an unintended pregnancy. If complete data by county were available for all clients served by public family planning programs (including Medicaid), we could potentially come up with an indicator of met-need. (For example: divide the number of women served at less than 150% poverty level by the number of women in the in-need population and multiply that by 100.) This would give some idea of completeness of coverage, which is not currently available.

Among the high risk group, 70 percent are using birth control pills as their primary means of contraception with usage of Depo Provera by 13.5 percent, condoms by 5.2 percent and sterilization by 3.6 percent. A further breakdown indicates that teenagers are more likely to choose the birth control pill (76.7%) or Depo Provera (14.9%). Women 39 or older (24.3%) and non-teenaged women with less than a high school education (60.4%) are among those least likely to use birth control pills and most likely to use condoms or sterilization as their primary means of contraception. Never married women are likely to choose oral contraceptives (74.7%). Women below the poverty level are the most likely high risk groups to report using Depo Provera (15.5%).

Initial visit high risk clients were more likely to use Depo Provera as their primary method of birth control than are women making annual visits with 15.8 and 12.0 percent reported, respectively. This higher usage of Depo Provera at the initial visit rather than the annual visit is the case for all the categories that make up the high risk group. Depo Provera is less client dependent than most other methods of contraception, which may make it more suitable for these clients.

Conclusion

The chief measure of a program's effectiveness is whether it accomplishes stated goals. Although we lack complete data for the state, it appears that the family planning program is meeting the goal of enabling women to better control their fertility through averting and/or delaying pregnancy. Corresponding to the increased aid to family planning programs has been a decrease in abortions

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Information for Foreign Travel

Americans love to travel, and it seems more and more are traveling to not only the popular places in the world like England, France and Spain, but to exotic areas as well, such as rural Africa and Asia. Although travel to the developed areas of the world normally poses no risk of disease to travelers, when passing through or staying in developing countries, disease risk can increase.

Vaccines for protection against tetanus/diphtheria, measles/mumps/rubella, hepatitis A and hepatitis B can easily be obtained from many physicians, and all travelers should check to assure they are up-to-date on these vaccines. Malaria prophylaxis may be obtained by prescription from physicians as well, although it may be necessary to determine if the country to be visited has chloroquine-resistant malaria. Vaccine to protect against yellow fever can only be obtained from a yellow fever vaccination center.

Because some countries require vaccination against yellow fever only if a traveler arrives from a country infected with this disease, it is essential that current information regarding infected areas be taken into consideration in determining whether vaccinations are required. Yellow fever vaccination centers should always be consulted well in advance of travel to determine the requirement of countries to be visited. Also, the centers can provide additional information on the need for malaria prophylaxis.

The Bureau of Immunization at (573) 751-6133 will provide information on suggested and required immunizations for foreign travel. Travelers should call to request this information well in advance of departure date.

The following is a list of yellow fever vaccination centers in Missouri as of January 1997:

TEAR OUT FOR FUTURE REFERENCE

Joplin City Health Department
513 Kentucky Avenue
Joplin, MO 64801
Ph: (417) 623-6122
Thurs. morning, 10 a.m. by appointment

Don S. Overend, M.D.
Smith-Glynn-Callaway Clinic
3231 South National Street
Springfield, MO 65807-7396
Ph: (417) 883-7422
Mon.–Fri., 8 a.m. to 5 p.m.
Sat., 8 a.m. to noon

Stephen D. Christiansen, M.D.
Ozark Medical-Surgical Associates, Ltd.
1900 South National, Suite 2800
Springfield, MO 65804
Ph: (417) 881-8819

Springfield-Greene County Health Center
227 East Chestnut
Springfield, MO 65802
Ph: (417) 864-1686
By appointment only

Clay County Health Department
1940 - 152 Highway
Liberty, MO 64068
Ph: (816) 781-1601
Mon., 2:30 p.m. by appointment

Allen J. Parmet, M.D., M.P.H.
Midwest Occupational Medicine
Union Hill Commons
3037 Main, Suite 201
Kansas City, MO 64108
Ph: (816) 561-3480

Hansa N. Patel, M.D.
Natu B. Patel, M.D.
Bethany Medical Clinic
Box 506, South 69 Hwy.
Bethany, MO 64424
Ph: (816) 425-3154

Kevin Suttmoeller, D.O.
Academic Medicine, Inc.
800 West Jefferson
P.O. Box 1029
Kirksville, MO 63501
Ph: (816) 626-2206

University of Missouri
Student Health Services
University of Missouri Campus
South 6th Street
Columbia, MO 65201
Ph: (573) 882-7481
Mon.–Fri. or Sat. by appointment

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Yellow Fever Vaccination Centers

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Donald P. Miller, M.D.
Internal Medicine, Inc.
St. Mary's Medical Plaza
Suite 302
Jefferson City, Mo 65101
Ph: (573) 636-7183

Philip Whatley, M.D.
New Tribes Mission
Medical Center
P.O. Box 1348
Camdenton, MO 65020
Ph: (573) 346-5656
Not open to the public

Dr. Vladimir Gelfand
Deaconess Medical Center
Clarkston Square Shopping Center
1751 Clarkson Road
Chesterfield, MO 63017
Ph: (314) 537-0377

James H. Hinricks, M.D.
Edward F. Hendershot, M.D.
Northwest Infectious Disease
Services, LLC
DePaul Professional Office
Building
12255 DePaul Drive
Suite 250
Bridgeton, MO 63044-2585
Ph: (314) 344-7070

Barnes Care
5000 Manchester
St. Louis, MO 63110
Ph: (314) 531-5078

Barnes Care (Downtown)
401 Pine St.
St. Louis, MO 63102
Ph: (314) 621-4300

Barnes Care West
11501 Page Service Road
St. Louis, MO 63146
Ph: (314) 993-3014
Mon.–Fri., 8 a.m. to 4 p.m.

St. Louis County Department of
Community Health and Medical
Practice
John C. Murphy Health Center
6065 Helen Avenue
Berkeley, MO 63134
Ph: (314) 854-6410 Ext. 6321
Mon.–Wed., 8 a.m. to 4 p.m.
Thurs., 8 a.m. to 7 p.m.
St. Louis County residents only

Trav-L-Med, Inc.
12818 Tesson Ferry Road
Suite 101
St. Louis, MO 63128
Ph. (314) 849-6611

David C. Campbell, M.D., M.Ed.
Family Medicine Program
Deaconess Hospital
6125 Clayton Avenue, Suite 222
St. Louis, MO 63139
Ph: (314) 768-3685

Farrin A. Manian, M.D., M.P.H.
David A. Janssen, M.D.
Adult Infectious Diseases
621 S. New Ballas Rd., Suite 3002
St. Louis, Mo 63141
Ph: (314) 569-6171

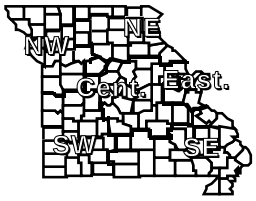
Victoria Fraser, M.D.
Infectious Disease
Washington University
School of Medicine
Box 8051, 660 S. Euclid
St. Louis, MO 63110
Ph: (314) 362-4412

Ann Nicolazzi, M.D.
Health Line Corporate
Health Services
1212 S. Grand
St. Louis, MO 63104
Ph: (314) 577-8060

Kirby Turner, M.D.
Kneibert Clinic
686 Lester, P.O. Box 220
Poplar Bluff, MO 63902-0220
Ph: (573) 686-2411

William C. Shell, M.D.
Ferguson Medical Group
1012 N. Main Street
P.O. Box 1068
Sikeston, MO 63801-5097
Ph: (573) 471-0330

Travelers' health information is available via Internet on the Centers for Disease Control and Prevention homepage at http://www.cdc.gov/ Choose the Travelers' Health menu to access guidelines for international travel. All material in the Travelers' Health menu is in the public domain, and may be used and reprinted without special permission. However, citation as to source is appreciated.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention
QUARTERLY REPORT

Reporting Period *
July - September, 1996

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	3 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1996	1995	FOR 1996	FOR 1995	5 YR MEDIAN
Vaccine Preventable Dis.																
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	1	0	7	7
Hib Other Invasive	0	0	0	0	0	1		0	0	1	0	2	2	7	12	32
Influenza	2	0	0	0	0	0		0	0	0	0	2	0	116	302	163
Measles	1	0	0	0	0	0		0	0	0	0	1	0	3	1	1
Mumps	1	0	1	2	0	0		0	0	0	0	4	5	5	22	32
Pertussis	8	0	3	0	2	3		7	2	1	0	26	25	40	42	59
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	1	0
Viral Hepatitis																
A	45	10	18	22	131	25		33	28	19	40	371	466	878	1073	872
B	11	1	1	1	6	1		8	11	2	2	44	113	167	334	374
Non A - Non B	3	0	2	0	0	1		3	0	2	0	11	7	31	18	21
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	1	9
Meningitis																
Aseptic	7	2	2	5	0	3		6	2	5	0	32	155	80	220	203
Meningococcal	3	0	5	0	0	0		0	0	3	0	11	11	53	36	28
Enteric Infections																
Campylobacter	18	8	25	19	32	19		9	3	40	15	188	233	420	501	492
Salmonella	26	5	25	21	24	16		6	9	25	4	161	224	375	420	413
Shigella	5	1	19	15	3	9		3	3	18	4	80	317	303	797	543
Typhoid Fever	0	0	0	0	0	0		1	0	0	0	1	1	2	2	2
Parasitic Infections																
Amebiasis	0	0	1	1	1	0		0	2	1	0	6	6	18	12	22
Giardiasis	23	15	45	15	31	24		7	5	34	20	219	241	521	476	512
Sexually Transmitted Dis.																
AIDS	10	4	4	9	11	6	1	39	77	48	7	216	236	598	568	194
Gonorrhea	60	13	127	130	73	27		612	694	386		2122	2974	6315	8704	9908
Prim. & Sec. syphilis	0	0	0	5	1	0		0	29	5		40	152	183	498	792
Tuberculosis																
Extrapulmonary	0	0	0	1	1	0	0	2	5	3	2	14	11	26	31	31
Pulmonary	3	1	5	3	2	1	0	13	14	3	3	48	41	125	134	145
Zoonotic																
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	1	0	1
Rabies (Animal)	1	0	0	1	1	0		0	0	0	1	4	6	17	25	25
Rocky Mtn. Sp. Fever	1	0	2	0	1	0		0	0	0	1	5	18	14	24	19
Tularemia	3	0	0	1	1	0		0	0	0	0	5	12	8	22	22

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 15
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 2
Leptospirosis - 1
Lymphogranuloma Venereum
Malaria - 3
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

Outbreaks

Foodborne - 2
Waterborne
Nosocomial
Scabies - 2
Other
Giardia - 4
Hepatitis A - 1
Shigella - 1
E. coli O157:H7 - 1
Legionnellosis - 1
Salmonella - 2

*Reporting Period Beginning June 30, Ending September 28, 1996.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE

Pneumococcal Vaccine—Increased Usage Needed

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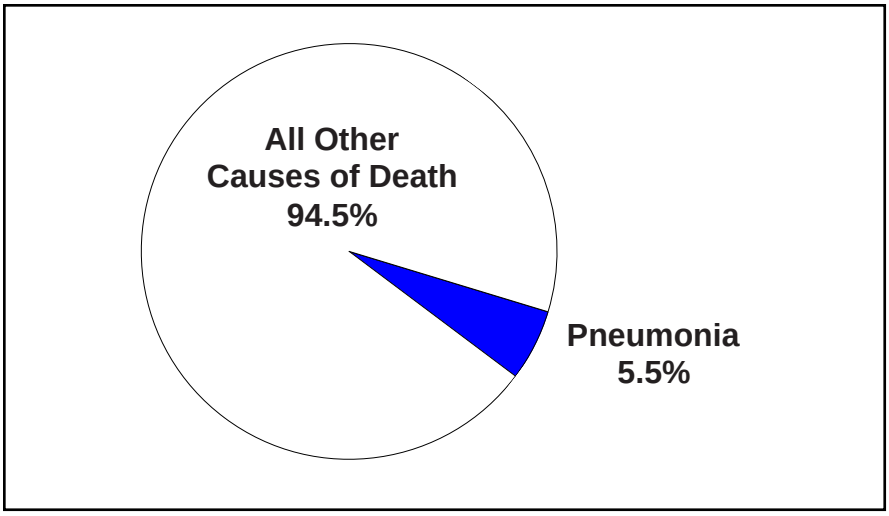

Figure 1. Percentage of total deaths due to pneumonia, Kansas City, Missouri, January–August 1996.

Pneumonia, whether acquired in the community or nosocomially, remains a serious disease condition and is a major cause of mortality.[1] Pneumonia accounted for 5.5 percent of the 3,649 deaths that occurred in Kansas City from January–August 1996. See Figure 1. In a meta-analysis of 122 studies involving more than 33,000 patients, it was found that mortality ranged from 5 percent in studies that covered ambulatory and hospitalized patients and 14 percent for studies that included only hospitalized patients to 31 percent for nursing home residents and 37 percent for intensive care unit patients. Men were more likely to die than women as were patients with certain disease conditions such as diabetes mellitus, neoplastic disease and tachypnea. Mortality was strongly associated with the cause of pneumonia, with bacterial infections, in general, carrying five to seven times the risk of viral infections.

Another recent study found that the case fatality rate for community acquired pneumonia was 7–9.7 percent with significant risk factors being that the person was ≥65 years old or infected with the human immunodeficiency virus or had a high severity of illness.[2]

The American Thoracic Society published a consensus statement on the diagnosis, assessment of severity, initial antimicrobial therapy and preventative strategies for hospital-acquired pneumonia in adults.[3] According to that publication, hospital-acquired pneumonias occur at a rate of 5-10 cases per 1,000 admissions, with the incidence increasing by as much as 6-20 times in patients who are being ventilated mechanically. Pneumonia currently is the second most common nosocomial infection in the United States and has the highest morbidity and mortality. Its presence increases hospital stay by an average of 7–9 days per patient.

Of the various etiologic agents of pneumonia, *Streptococcus pneumoniae* is the leading cause of fatal bacterial pneumonia in developing countries and now accounts for significant morbidity and mortality due to infectious diseases of the respiratory tract, sepsis and meningitis in the United States and other developed countries. It causes an estimated 3,000 cases of meningitis, 50,000 cases of bacteremia, 500,000 cases of pneumonia, and more than seven million cases of otitis media each year in the United States alone.[4] Pneumococcal disease has a consistent preference for males that remains unexplained. Alcoholism is also a predisposing factor for pneumococcal pneumonia with infections being more severe and prolonged.[5]

The capsular serotype of *S. pneumoniae* is the most important subclassification of the species because it has the strongest known influence on human immunity.[6] Susceptibility to invasive disease is determined by the ability of the host to generate specific opsonizing antibody against capsular antigens. Any one serotype will be at an advantage if the homologous antibody response in the host is blunted either by lack of previous exposure or by variation in the maturation of humoral immunity with age.

An important determinant of the ecological success of *S. pneumoniae* is its ability to transfer from one host to another in different environments. The density, age structure and socioeconomic conditions of human populations all affect the indices of transmission, namely the incidence of pneumococcal pneumonia, the number of effective contacts (i.e., contact between two individuals in which transmission occurs) per case, the prevalence of carriers, and the rate of effective contact between carriers and uninfected individuals.[6] Since there is marked variation among serotypes of *S. pneumoniae* in their propensity to colonize the nasopharynx they exploit different human environments with varying degrees of success. The geographic distribution of a serotype is likely to reflect the environmental characteristics that most suit its transmission.

Prior infection by respiratory viruses and exposure to cold weather have been regarded as factors that predispose to pneumococcal pneumonia. A recently published study of a community-wide sur-

veillance program in Houston examined the relationship of invasive pneumococcal disease to season, atmospheric conditions and the rate of respiratory virus isolation.[7] For children, the correlations tended to be stronger for events that occurred one month previously than for those that occurred contemporaneously and was consistent with the concept that viral or allergic events predispose to otitis media with effusion which becomes suppurative and leads to pneumococcal bacteremia or meningitis. For adults, a more immediate predisposition to pneumococcal pneumonia and bacteremia because of viral infection or air pollution was suggested.

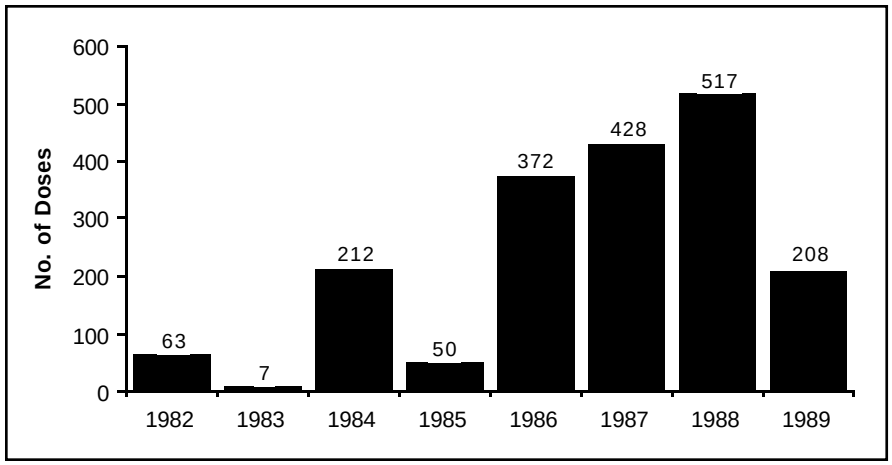

Figure 2. Pneumococcal vaccine doses administered, Kansas City, Missouri health department, 1982–89.

There are ≥90 serotypes of *S. pneumonia*e and 23 of these have been incorporated into a pneumococcal polysaccharide vaccine. These 23 serotypes are responsible for 85–90 percent of bacteremic infections. The vaccine is recommended for persons ≥2 years of age who are at increased risk of pneumococcal disease and its complications because of underlying health conditions. *(Pneumococcal vaccines for persons ≤2 years of age are in phase III clinical trials and could be available within 5 years.*[8]*)* In addition, the vaccine is recommended for older adults including all those ≥65 years of age. A booster dose every three to five years is recommended for persons at especially high risk of fatal pneumococcal infection, e.g., splenic dysfunction or asplenia. Revaccination of other persons should be considered if ≥6 years have elapsed since initial vaccination. Pneumococcal vaccine can be administered with other vaccines.

Since late 1977, the Kansas City Health Department and others have advocated the use of pneumococcal vaccine, yet there remained controversy within the medical community over its value.[9] The vaccine is efficacious in healthy adults, however, questions regarding efficacy in high risk populations and older individuals led to reluctance to use it. A study at two medical facilities in Florida examined what were the barriers to pneumococcal vaccination by house staff.[10] Although most physicians (94%) knew of the usefulness of the vaccine, many (66%) failed to translate this knowledge into clinical practice. The majority of physicians (70%) were not confident about their knowledge regarding vaccine guidelines and 61% had an exaggerated fear of hypersensitivity reactions. Neither the expense of the vaccine nor adverse publicity were impediments to immunization. 'Pressing' clinical issues were viewed by over half of the physicians as barriers to vaccination and, consequently, they placed the practice of preventive medicine into a subordinate position. Yet, recent observational studies in older individuals have confirmed and quantified the effectiveness of pneumococcal vaccine in situations of actual use.[11] Pneumococcal vaccine became a covered Medicare benefit in 1981 and economic data indicate that under realistic situations it is likely to reduce costs for health care systems with a net savings of $141 to a third-party payer per person vaccinated.[12]

With the ominous emergence of antibiotic resistant *S. pneumoniae,* not only is morbidity and mortality likely to increase sharply, there will be increased costs involved in treating these infections.[4] *S. pneumoniae* had been almost uniformly susceptible to penicillin. However, with the development and worldwide spread of drug-resistant *S. pneumoniae* (DRSP) a public health challenge has arisen. The prevalence of pneumococcal resistance to antimicrobial drugs is not known for most areas of the United States since DRSP infection has not been a reportable condition. Some studies have suggested great geographic and temporal variation in levels of resistance with prevalence rates of 2-30 percent.[13] Within communities, the proportion of pneumococcal illnesses caused by DRSP among children may be markedly different from that among adults. Consequently, communities with high levels of antimicrobial resistance and persons at highest risk of infection would benefit from efforts to raise the level of immunization against *S. pneumoniae*.

Pneumococcal and influenza vaccines are the cornerstones of an adult immunization program. They are cost saving or cost effective under many conditions and are clearly life saving. Attention should be directed to methods of increasing vaccine use in the elderly, and to better define better the societal and economic benefits of use in other segments of the population in which effectiveness has been long recognized.[11] Towards that end, the Missouri Patient Care Review Foundation is actively campaigning for health care providers to increase the utilization of pneumococcal and influenza vaccines among their Medicare clients. (For further informa-

(continued on page 23)

Opportunities for Improving the Care of Patients with Community-Acquired Pneumonia

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Michael Boechler, Ph.D.
Theresa Luebbering
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Missouri Patient Care Review Foundation

Tremendous potential exists for significantly improving the treatment of Medicare patients hospitalized with community-acquired pneumonia (CAP). Recent collaborative quality improvement efforts between the Missouri Patient Care Review Foundation (MPCRF) and five hospitals in the state are demonstrating that self-monitoring by the facilities of their treatment processes, along with ongoing analysis, can positively enhance the outcomes and quality of care for patients admitted with CAP.

In Missouri, CAP is the second leading cause of hospital admissions in the Medicare population. In calendar year 1993, more than 18,000 Medicare patients were admitted to acute care hospitals with a principal diagnosis of pneumonia (ICD-9-CM codes 480–486). These pneumonia admissions represented 6.6 percent of all Medicare admissions during the same period. Statewide, the case fatality rate was 9.6 percent (range = 0, 20.7) with an average length of stay (LOS) of 8.2 (range = 1, 135) days.

Based on the initial statewide analysis, summarized above, MPCRF conducted pattern analysis to determine variation in provider mortality rates and average LOS for CAP patients. Selected hospitals, whose mortality rates and/or LOS were statistically different from the statewide rates and/or LOS, were contacted regarding participation in an improvement project. Based on this solicitation, four hospitals agreed to collaborate in a pneumonia project. A fifth hospital contacted the Medicare peer review and quality improvement organization (PRO) and volunteered to collaborate on the pneumonia LOS project.

MPCRF's collaboration with the five hospitals focuses on process changes, as well as outcomes associated with the initial evaluation and treatment of CAP. These efforts are being conducted in conjunction with the Health Care Quality Improvement Program (HCQIP), designed to promote the quality, effectiveness, efficiency and economy of services to Medicare beneficiaries. Two of the five hospitals are participating in a project designed to reduce the mortality due to CAP; the other three, in a project to reduce the length of stay for CAP patients.

Background for the CAP Projects

In April 1993, an article was published in the *Quality Review Bulletin* (QRB), which described the results of the efforts of a community hospital to implement a critical pathway for CAP, based on severity of illness.[1] The study addressed the importance of specific process changes, including prompt antibiotic administration, in significantly reducing in-hospital mortality, length of stay, and total charges. Based on the findings of medical record reviews and subsequent discussions, the hospital's multidisciplinary task force made the following management and process-related recommendations for all CAP patients admitted through the emergency room (ER):

- Obtain sputum cultures on all patients.
- Draw blood culture twice.
- Administer antibiotics within four hours.
- Use antibiotics that cover *Mycoplasma* and *Legionella* (e.g., macrolides).

The recommendations emphasized that the above should be carried out as soon as possible, preferably while the patient is still in ER. In addition, a pulmonary and infectious disease consultation was encouraged if no improvement occurred within 48 hours. Eighteen months after implementing these process changes, pneumonia mortality rates and LOS for pneumonia decreased significantly at the community hospital.

The American Thoracic Society (ATS) also drew attention to this topic with the publication in November 1993 of guidelines for the initial management and treatment of adults with CAP.[2] The ATS guidelines, which take into account the limitations of diagnostic testing to identify specific pathogens, recommended that initial patient management be based on an assessment of the severity of the patient's illness and rapid initiation of empirical, severity-based antibiotic treatment, under the assumption that certain pathogens are likely causing the infection.

In February 1994, MPCRF convened a special study group, including two pulmonary disease specialists, to review and discuss the ATS guidelines and the QRB article. The result was an endorsement by the study group of both the ATS guidelines and the specific process changes recommended in the QRB article to form the basis for a local (within-state) improvement project. The study group recommended, however, that the project focus only on bacterial CAP. Based on this recommendation, case definitions for purposes of data collection and analysis were narrowed to the ICD-9-CM codes for bacterial pneumonia (481–483.8, 485 and 486).

Project Implementation

An initial task was the collection of baseline data for the selected hospitals to determine the extent of compliance with the ATS guidelines and QRB pro-

cess recommendations. The subsequent analysis of these data, abstracted from medical records of discharges occurring prior to the collaborative process changes at the hospitals, indicated less than desirable compliance with most of the practice recommendations. See Table 1. Utilizing this information on a provider-specific basis, each of the five hospitals developed and initiated a plan to improve its process for the care and treatment of patients who present with CAP at time of admission.

In addition to implementing certain process changes, the collaborating hospitals also agreed to complete data collection forms for each Medicare CAP patient admitted for a specified period of time and to submit these data to the PRO on a monthly basis. The information is currently entered into a database by MPCRF staff, allowing for analysis and the production of feedback reports that are subsequently shared with the collaborating hospitals to assist them in monitoring their process improvement.

Claims Analysis Results

A preliminary analysis recently conducted on the two outcome measures, patient mortality and length of stay, suggests that there has been improvement. Figure 1 displays the baseline and post-intervention mortality results of claims analysis for the two hospitals participating in the CAP mortality project. In the graph, the *baseline* figures represent the aggregate bacterial CAP discharges for the two hospitals during a one-year time period, prior to the implementation of any process changes. The *post-intervention* results, also based on aggregate claims, represent bacterial CAP discharges occurring **after** the process changes were implemented. Although the latter represents only a portion of a calendar year, it is encouraging to observe a downward trend in mortality from an initial baseline rate of 14.0 percent to a preliminary post-intervention rate of 8.7 percent.

(continued on page 18)

Table 1. Aggregate Baseline Data for Five Hospitals Participating in Community-Acquired Pneumonia (CAP) Projects, 1993

Indicators	Baseline
Cases with "Severe" CAP	78.7% (499)
Mortality	12.0% (76)
Average Length of Stay	10.16 days
Admitted From Home	66.3% (420)
Admitted From Nursing Home	32.0% (203)
Admitted Through ER	71.9% (456)
Within 4 Hours of Presentation:	
Sputum Gram Stain Obtained	18.8% (119)
Sputum Culture Obtained	19.1% (121)
Blood Cultures Obtained	48.0% (304)
Within 48 Hours of Presentation:	
Chest X-ray Positive for Infiltrate	80.8% (512)
Antibiotic Administered Within 4 Hours of Presentation	50.8% (322)
First Dose Administered:	
In ER	20.7% (131)
Average Time for Administration	2.68 hours
On Floor	74.8% (474)
Average Time for Administration	6.00 hours
In ICU	3.8% (24)
Average Time for Administration	5.12 hours
"Severe" Cases Receiving a Macrolide	8.0% (40)
Total Number of Cases	**634**

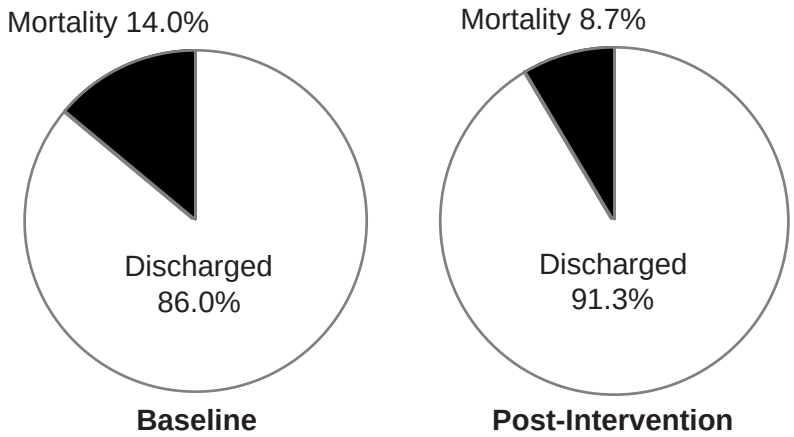

Figure 1. Baseline and post-intervention mortality results of claims analysis for two hospitals participating in community-acquired pneumonia mortality project, 1993.

(continued from page17)

Analysis of the claims data for the pneumonia LOS project also suggests improvement in outcome. As shown in Figure 2, which displays the baseline and post-intervention results of claims analysis for the three hospitals participating in the LOS project, length of stay appears to have been reduced from an average of 10 days to 8.5 days.

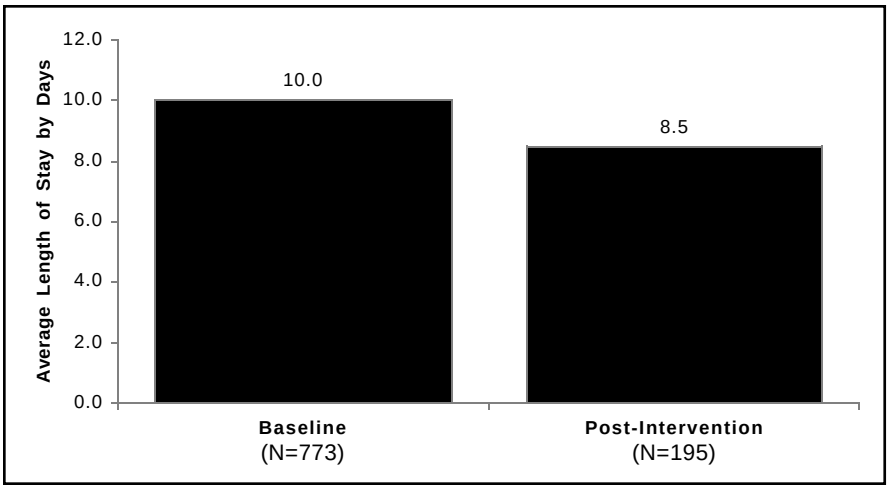

Figure 2. Baseline and post-intervention results of claims analysis for three hospitals participating in length of stay project, 1993.

The preliminary results suggest that the monitoring of key process indicators, with ongoing analysis and feedback to the collaborative facilities, has potential for facilitating positive change in the quality of care for CAP patients. Based on the early indications of success with this project, MPCRF will be undertaking another project, with a different but slightly larger group of providers, focusing on improving both LOS and mortality associated with CAP.

MPCRF is the federally designated Medicare peer review and quality improvement organization for Missouri under a contract with the Health Care Financing Administration (HCFA). Conclusions and opinions expressed, as well as the methods used, are those of the authors and do not necessarily reflect HCFA policy or perspectives. The authors assume all responsiblity for the accuracy and completeness of the PRO data used.

NOTE: *MPCRF would like to acknowledge Pierrette Bentivegna, M.P.H. for her earlier work on the project.*

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1. McGarvey RN and Harper JJ. Pneumonia mortality reduction and quality improvement in a community hospital. Quality Review Bulletin 1993;19: 124–29.
2. American Thoracic Society. Guidelines for the initial management of adults with community-acquired pneumonia: Diagnosis, assessment of severity, and initial antimicrobial therapy. American Review of Respiratory Disorders 1993;148:1418–26.

Tuberculosis Awareness Fortnight

Each year the American Lung Associations of Eastern and Western Missouri, along with the Missouri Department of Health, Bureau of Tuberculosis Control, co-sponsor Tuberculosis Awareness Fortnight. This upcoming event is scheduled to take place March 9–22, 1997.

Tuberculosis Grand Rounds are planned in Kansas City on Friday, March 21, 1997. One is scheduled at St. Luke's Hospital in Kansas City at 8:00 a.m. and the other will be held at the University of Missouri-Kansas City School of Medicine (Truman Medical Center) at 12:00 noon.

For further information regarding these and other events, or to obtain additional information or literature on tuberculosis, please contact:

American Lung Associations
of Eastern and Western Missouri
(800) LUNG-USA
or
Bureau of Tuberculosis Control
(573) 751-6122

Update on Viral STDs: Genital Herpes and Human Papillomavirus March 20, 1997

7:00–9:00 a.m. or 11:00–1:00 p.m., CST

This national satellite teleconference is co-presented by the St. Louis STD / HIV Prevention Training Center. This continuing education program for health care professionals is offered free of charge. Downlink sites in Missouri are in Independence, Jefferson City, Macon, Poplar Bluff, St. Louis and Springfield.

For more information or to register, please call (314) 747-1522.

Decline in SIDS Deaths

Janice Bakewell
Bureau of Health Data Analysis

Sudden Infant Death Syndrome (SIDS) is the leading cause of death in infants older than 1 month and less than 1 year of age, accounting for 42 percent of post-neonatal deaths among Missouri resident births during the period from 1990–95. However, over this six-year interval, the SIDS rate has fallen by nearly 50 percent.

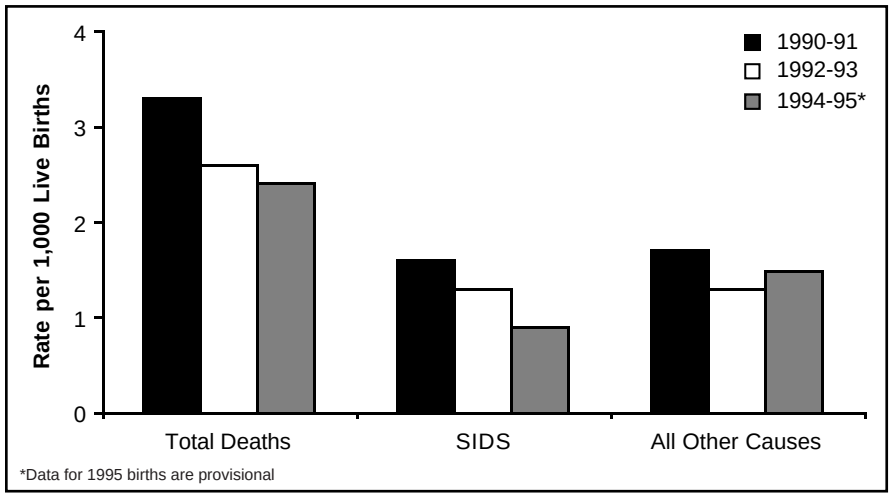

Figure 1. Mortality Rates per 1,000 Live Births Among Infants Older Than 1 Month of Age by Cause of Death and Year of Birth, Missouri, 1990–95.

In June 1992, the American Academy of Pediatrics issued recommendations that most healthy infants be placed to sleep in a supine or lateral (back or side down) position in order to reduce the risk of SIDS. There was considerable resistance among some physicians to recommend this change from the prone (stomach-down) position traditionally favored in the United States.[1–3] Among justifications cited by some physicians for avoidance of the supine position were the perceived risk of aspiration of stomach contents and concerns about the applicability of findings from other countries to the United States population. In January 1994, at an international conference on SIDS, data were presented indicating that the earlier observed reductions in SIDS associated with a change in sleep position had been sustained, and the increased number of infants sleeping in the supine position had not been associated with any harmful consequences.[4–5] As a consequence, the supine position is now more widely accepted. Survey data show a nationwide decrease of the prone sleeping position, from 73 percent in 1992 to 29 percent in 1995.[6]

A Missouri development that may have had an impact on reported SIDS rates was enactment of legislation, implemented in January 1992, mandating autopsies, death scene investigations, and multi-disciplinary (e.g., physician, law enforcement, and social services) child-fatality review team investigation of all sudden, unexplained child deaths. Because SIDS is a diagnosis of exclusion, the implementation of these measures in Missouri had the potential for causing a number of infant deaths which might previously have been classified as SIDS to be assigned other causes of death, e.g., previously undiagnosed diseases, accidental suffocation or homicide.

We studied SIDS deaths among 1990–95 Missouri resident births. The data for 1995 births are provisional, but because 96 percent of SIDS deaths among 1990-94 births occurred within the first six months, we believe the data are nearly complete. That is, most if not all SIDS deaths in infants born in 1995 had occurred within the first six months and their death certifcates were included in the data set when this study was undertaken.

(continued on page 20)

Table 1. Number and Rate of SIDS Deaths and Percentage Autopsied by Race and Year of Birth, Missouri Resident Births, 1990–95

Year of Birth	Number of SIDS Deaths			SIDS Mortality Rate per 1,000 Live Births			Percent of SIDS Deaths Autopsied		
	Total	Non-Black	Black	Total	Non-Black	Black	Total	Non-Black	Black
1990	132	85	47	1.7	1.3	3.5	86	80	96
1991	144	100	44	1.8	1.5	3.1	94	93	98
1992	109	87	22	1.4	1.4	1.7	100	100	100
1993	110	78	32	1.5	1.3	2.5	100	100	100
1994	80	59	21	1.1	1.0	1.8	100	100	100
1995*	67	55	12	0.9	0.9	1.1	100	100	100

*Data for 1995 births are provisional

(continued from page 19)
SIDS deaths and rates per 1,000 births by year of birth and race are presented in Table 1. From 1990–95, Missouri SIDS deaths fell from 132 to 67, and the rate fell by 47 percent, from 1.7 to 0.9 per 1,000 live births. SIDS rates fell earlier and more sharply among blacks. In 1990, blacks were 2.7 times as likely to have a SIDS death than non-blacks, while the gap for 1995 narrowed to 1.2.

The extent to which the decrease in reported SIDS cases represents fewer lives lost rather than a reclassification of deaths cannot be quantified. The percent of reported SIDS cases that were autopsied are presented in Table 1. Prior to 1992, although not all SIDS cases were autopsied, the autopsy rate was still very high, particularly among black SIDS deaths.

Table 2. Adjusted Relative Risk of SIDS for Selected Characteristics, Missouri Resident Births, 1990–95

Characteristic	Adjusted Relative Risk†	95% Confidence Interval
Black	1.13	0.90–1.37
Low Birth Weight (<2,500 grams)	2.10	1.88–2.32
Male	1.88	1.71–2.05
Maternal Smoking*	2.31	2.13–2.48
Maternal Age <20*	1.95	1.70–2.19
2nd–3rd Birth	2.50	2.28–2.72
4th+ Birth	3.19	2.89–3.48
Maternal Education <12 yrs*	1.31	1.12–1.51
Late/No Prenatal Care	1.27	1.05–1.47
Unmarried Mother*	1.52	1.32–1.73
Non-metropolitan Residence*	1.02	0.84–1.20

† Relative risk after adjusting for birth year and all other variables, in comparison to reference group listed in Table 3, e.g., for blacks, adjusted relative risk in reference to non-blacks; for 2nd–3rd and 4th+ births, adjusted relative risk in reference to first births.
* Maternal characteristic at birth

Figure 1 shows overall mortality rates and mortality rates due to SIDS and all other causes, for infants 1–6 months of age (the age range within which 90 percent of SIDS deaths occur). The overall mortality rate and the rate of deaths due to causes other than SIDS also fell during the time period from 1990–95. We additionally examined other subcategories of causes of mortality, such as homicide and other injuries, without finding major increases that would suggest an important trend toward reclassification of deaths. Thus, it seems that most of the decrease in reported SIDS cases actually reflects a decline in the incidence of this condition.

We examined the incidence of SIDS among 1990-95 births by selected risk factors for which data are available (sleep position was not available). Through multiple logistic regression we obtained the adjusted relative risk (ARR) and 95 percent confidence interval (CI) for the risk of SIDS for a given risk factor, after adjusting for birth year and the other risk factors in the logistic regression model. These data are presented in Table 2.

Table 2 shows that within the 1990-95 time period, a 1.13 ARR for black births was observed, which was not statistically significant because the CI includes 1.00. Low birth weight (less than 2,500 grams) was associated with a 2.10 ARR, or twice that of normal-weight births, and male sex was associated with an ARR of 1.88; both of these associations were statistically significant. These three variables–black race, low birth weight and male sex– have been shown elsewhere to be important risk factors for SIDS.[5] Maternal smoking and low maternal age are other important risk factors for SIDS. Maternal smoking in pregnancy was associated with a 2.31 ARR for SIDS. Both smoking in pregnancy and exposure to cigarette smoke after birth have been identified elsewhere as major risk factors for SIDS.[6] Infants of teen mothers have a 1.95 ARR in comparison with infants of older mothers.

The risk of SIDS increases with increased birth order. Second and third births have an ARR of 2.50 in comparison with first births; for fourth- and higher-order births the ARR is 3.19. The increase in risk with increasing birth order is statistically significant. Smaller but statistically significant ARRs were also observed for other risk factors: 1.31 for maternal education less than 12 years; 1.27 for infants of women receiving late prenatal care (after the fourth month of pregnancy) or no prenatal care; and 1.52 for infants of unmarried mothers. Each of these variables is associated with low socioeconomic status, shown elsewhere to be a risk factor for SIDS.[5,6] Non-metropolitan residence was not found to be a significant risk factor for SIDS.

Which groups benefited most from the decrease in SIDS rates between 1990 and 1995? We examined SIDS rates for 1990-91 and 1994-95 births by the presence or absence of risk factors previously discussed. The number and rate of SIDS deaths for each time period are presented in Table 3, along with the percentage that the SIDS rate decreased for 1994-95 births in relation to 1990-91 births. Because of the relatively small number of SIDS deaths, only unadjusted rates could be developed.

As previously discussed, SIDS rates decreased much more rapidly for blacks than for non-blacks. The 56 percent decrease in SIDS among blacks from 1990-91 to 1994-95 was the greatest decrease

Table 3. Number and Rate of SIDS Deaths by Year of Birth and Selected Characteristics with Percentage Decrease in Rates, Missouri Resident Births, 1990–95

Characteristic	SIDS Deaths by Year of Birth 1990–91	SIDS Deaths by Year of Birth 1994–95†	SIDS Mortality Rate per 1,000 Live Births by Year of Birth 1990–91	SIDS Mortality Rate per 1,000 Live Births by Year of Birth 1994–95†	Percentage Decrease in SIDS Mortality Rate, 1990–91 to 1994–95
Non-black	185	113	1.4	0.9	35.4
Black	91	34	3.3	1.5	55.7
Non-LBW*	234	119	1.6	0.9	45.0
LBW*	42	27	3.6	2.4	33.4 NS
Female	87	65	1.1	0.9	18.9 NS
Male	189	82	2.4	1.1	53.5
Non-smoker**	136	85	1.1	0.7	36.0
Smoker**	139	61	3.6	2.1	43.2
1st Birth	60	42	1.0	0.7	26.5 NS
2nd–3rd Birth	158	75	2.0	1.1	47.5
4th+ Birth	57	29	3.5	2.0	43.3
Age 20+**	212	111	1.6	0.9	43.5
Age <20**	64	36	2.8	1.7	40.0
Early Prenatal Care	207	120	1.5	0.9	40.0
Late/No Care	60	24	3.1	1.9	37.5
12+ Years Education**	151	90	1.2	0.8	37.4
<12 Years Education**	116	54	3.5	1.9	44.9
Married**	133	74	1.2	0.7	37.3
Unmarried**	143	72	3.1	1.5	50.7
Metropolitan Resident**	161	83	1.7	1.0	41.9
Non-Metro Resident**	115	64	1.8	1.0	43.4
Total	**276**	**147**	**1.8**	**1.0**	**42.6**

† Data for 1995 births are provisional
* LBW=Low Birth Weight (<2,500 grams)
** Maternal characteristic at birth
NS Decrease in 1994–95 rate from 1990–91 rate is not statistically significant

observed among all subcategories studied. The 54 percent decrease among male infants was also dramatic, especially in comparison with the 19 percent, statistically insignificant, decrease for females. The 1994-95 data indicate that these historically important risk factors for SIDS may be becoming less important, but because of the small number of SIDS deaths, we cannot make that determination until more data become available.

Infants of unmarried mothers had a greater percentage decrease in the rate of SIDS than infants of married mothers (51 vs. 37 percent, respectively). This decrease reflects more than the differing racial makeups of the two groups; among both blacks and non-blacks, the decrease in rates was higher among births to unmarried mothers.

Although SIDS decreased among low-birth-weight infants, these infants remained especially vulnerable to SIDS. The SIDS rate among low-birth-weight infants decreased 33 percent, well less than the 45 percent decrease observed among normal-weight births. Low birth weight was the only risk factor for which no statistically significant decrease in the SIDS rate was observed between 1990–91 and 1994–95.

The SIDS rate associated with infants of mothers who smoked during pregnancy

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SIDS Deaths

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decreased 43 percent, while for infants of non-smokers a decrease of 36 percent was observed. Smoking in pregnancy decreased from 24.5 percent in 1990-91 to 20.4 percent in 1994-95. This resulted in the observed SIDS deaths for 1994-95 being about six percent lower than would have been expected had smoking rates remained at 1990-91 levels.

SIDS decreased more rapidly among higher-order births (48 and 43 percent for 2nd–3rd and 4th plus births, respectively) then among first births (27 percent), and a greater decrease was observed among women with less than 12 years education (45 percent) than among infants of mothers with high school education or more (37 percent). Comparable decreases were observed among infants of teen and non-teen mothers, early and late/no prenatal care recipients, and metropolitan and non-metropolitan residents.

In summary, in recent years Missouri has experienced sharp decreases in the rate of SIDS among both high risk (such as black, male, low-birth-weight) and low risk infants, and among infants from both lower and higher socioeconomic groups. We assume that Missouri residents have followed the nationwide trend in the decline of prone sleeping position, and that avoidance of the prone sleeping position is the most important factor in the decrease, but reductions in smoking may have also contributed to the decline in SIDS cases. In addition, some of the decrease in SIDS in Missouri may reflect changes in cause of death recording rather than a true decrease in deaths.

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State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Jul 96	Aug 96	Total YTD
Specimens Tested	11,257	10,573	81,972
Initial (percent)	63.4%	63.4%	51,598
Repeat (percent)	36.6%	36.6%	30,374
Specimens: Unsatisfactory	175	164	1,244
HT Borderline	1,153	1,226	10,556
HT Presumptive	33	38	543
PKU Borderline	8	4	46
PKU Presumptive Positive	0	2	7
GAL Borderline	67	112	884
GAL Presumptive Positive	3	3	13
FAS (Sickle cell trait)	95	70	615
FAC (Hb C trait)	21	22	186
FAX (Hb variant)	16	17	110
FS (Sickle cell disease)	1	0	13
FSC (Sickle C disease)	2	1	8
FC (Hb C disease)	0	1	2

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Meningococcal Disease in Southwest Missouri

(continued from page 3)
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Family Planning

(continued from page 10)
(from 17,947 in 1990 to 13,635 in 1995) and a 31.8 percent decline in births occurring to women within 18 months of a previous birth (from 6,303 in 1990 to 4,301 in 1995) indicating that some unintended pregnancies are being avoided. Another measure of success is the change in contraception that we are seeing as a result of family planning visits. Most clients leaving a family planning visit are practicing some form of contraception, and usually a method more effective than the one they were using prior to the visit.

An important part of the current effort in family planning is to provide services to those who are most in need of help to control their fertility. The overwhelming proportion of females utilizing public family planning services are those who are at highest risk for unintended pregnancy, and therefore, are the ones most in need of these services. Although the population distribution of Missouri females is changing as the baby boomers move out of the fertility range (15–44), the number of women in this age range will not decline to the 1980 level of 1,113,112 until 2005 when 1,100,634 are projected. Consequently, the need for family planning services will not only increase in the immediate future, but as the fertile range becomes more weighted toward the younger age groups, it may actually increase even more due to these age groups' higher levels of fertility and increased risks of unintended pregnancies. The individual and public benefits derived from the ability to control one's fertility and truly plan one's pregnancy so that each pregnancy is wanted, and therefore, cared for in the best possible circumstances are immense.

This description of clientele at family planning clinics is incomplete due to the percentage of unknowns for such key variables as education and income status as well as the lack of individual client data from the major metropolitan areas and other funding sources. Consequently, it is impossible to tell with any degree of certainty who public family planning is serving. If information from all public family planning providers and private physicians serving Medicaid were available, we would have some idea of met need for the most vulnerable population and from that we could get a better handle on unmet need.

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Pneumococcal Vaccine

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tion on this campaign, call 1-800-735-6776.) See related article on community-acquired pneumonia on pages 16–18 of this issue.

Through the 1980s, the Kansas City Health Department offered pneumococcal vaccine in conjunction with its annual influenza vaccination campaign. See Figure 2. However, inadequate and inconsistent funding limited the amount of vaccine that could be purchased and administered. This initiative ceased in 1990.

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VIDEO CONFERENCE

Adult Immunizations
April 24, 1997

The next CDC video conference will highlight successful adult immunization programs in different health care settings such as private practices and long-term care facilities. This video is designed to show programs that have been successful in reaching the adult population. The video conference is targeted to family practice physicians, internists, HMOs, public and private clinics and Medicaid and Medicare providers. The time for the teleconference has not been determined. Please mark the date on your calendar and watch for your registration form in the mail.

If you have questions, please contact Georgia Storm, Bureau of Immunization, at (573) 751-6133.

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